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JAMAICA BAY

IMPROVEMENT

A NEW GATEWAY TO AMERICA

What the Plans are and what
Effect this Improvement will
have on New York's Commerce

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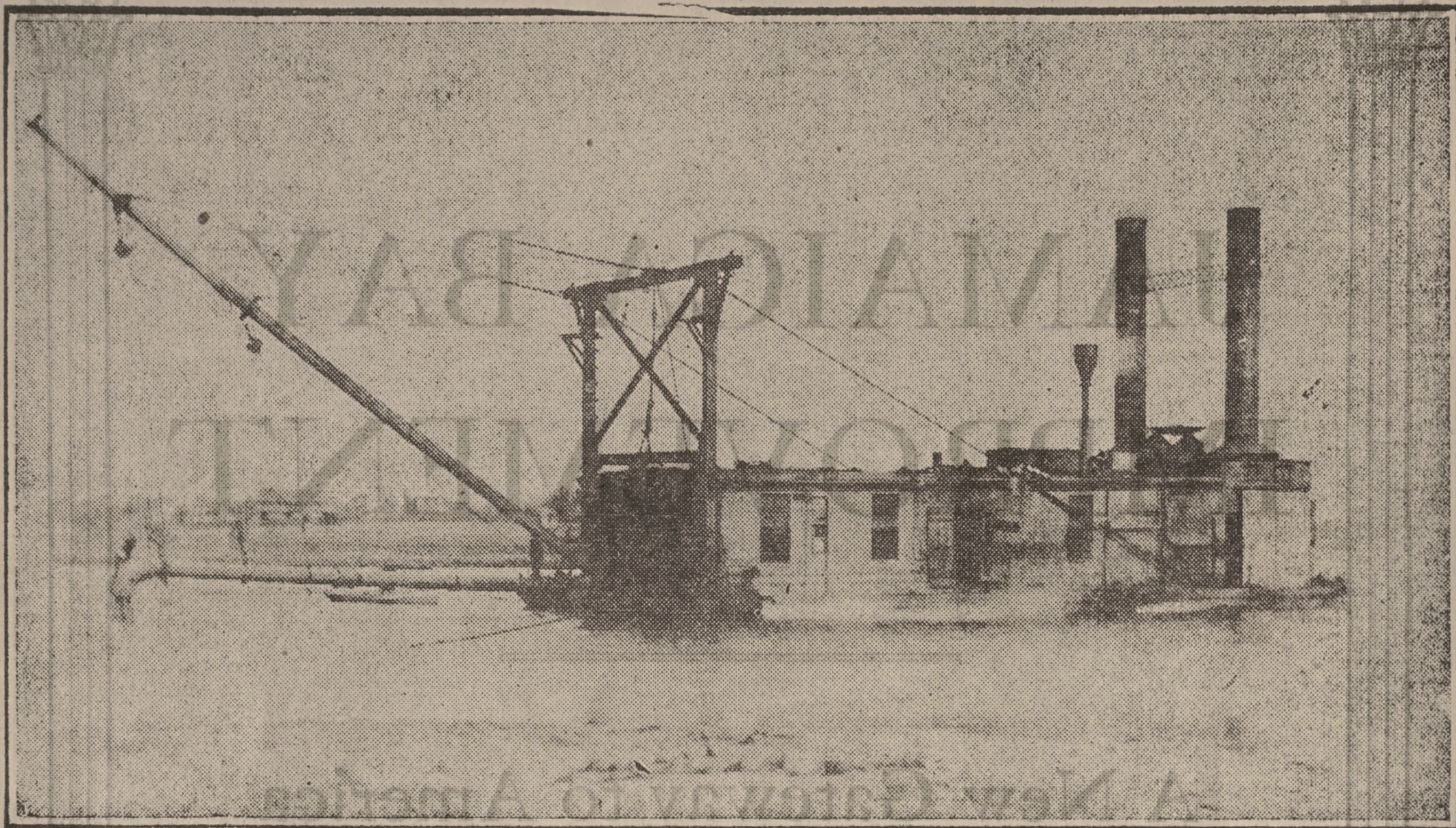
JAMAICA BAY IMPROVEMENT

A New Gateway to America

What the Plans Are and What Effect
This Improvement Will Have on
New York's Commerce.

OFFICE OF PUBLICATION:
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JAMAICA BAY IMPROVEMENT

The question of the Jamaica Bay Improvement is one which has been discussed pro and con for many years. Some of New York's most influential citizens have been, and are, very enthusiastic over the project. Who is the father of the plan is not a settled question. A number of citizens living in the neighborhood of Jamaica Bay suggested a plan of improvement years ago. Frederick Wygant, a lawyer, of Manhattan, has been interested in the project for many years. Probably most credit is due, however, to Edward M. Grout for the beginning of a real agitation. He was the first to put before the government a definite and tangible proposition. Since then, organizations have been effected to promote legislation and educational campaigns. Other men and organizations have been just as persistent in claiming that the scheme is impossible of successful solution. However, the commission appointed by the Mayor has made a thorough investigation, and, although there is both a majority and a minority report, all members of the commission agree that Jamaica Bay should be developed as a seaport.

With the appropriation by the United States Government of \$225,000 to be spent annually for a number of years, providing New York City does its part, enthusiasm for the project has been considerably enhanced. It is practically certain that the city will appropriate \$1,000,000 for the preliminary work, and so put its stamp of approval on the favorable reports of the commission. The city appropriation will, in the first instance, be devoted to the survey work involved in the laying out and planning of what promises to be the greatest harbor that has ever been projected. Necessarily, it will be a work of some years, but, when completed, a revolution of the Port of New York will have been wrought. The passages of freight steamers will be shortened some hours and the inconveniences of the present terminals of the port will be overcome, while the facilities for ocean traffic will be greatly improved. Whether the passenger steamers will find their dockage there is a question which must be left to development.

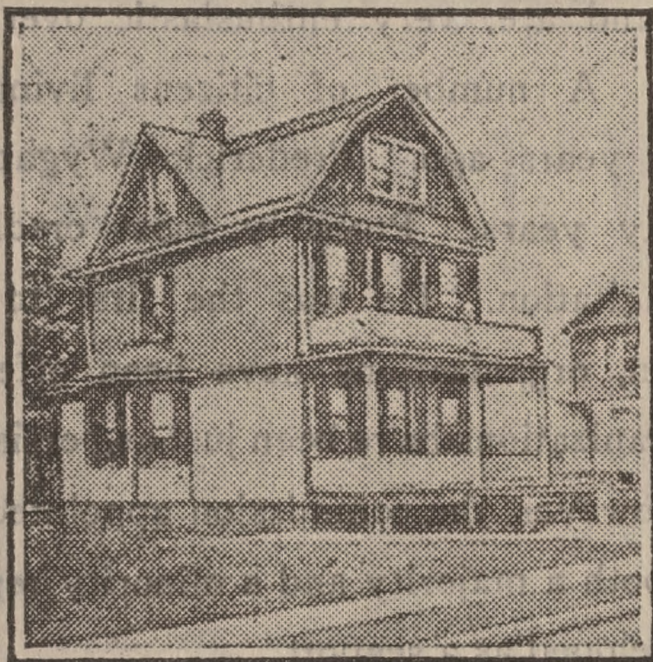
What the influence on the boroughs of Brooklyn and Queens, of the completed work, will be can hardly be overestimated. It is quite clear that there will be great changes in real estate values. Properties of Brooklyn now held for future development will naturally be enhanced in values. Brooklyn will lose the distinction she has so long held as a city and a borough of being a city of churches and homes. She will become as great a part, commercially, of Greater New York as is Manhattan. Every citizen of the greater city will share in the benefits of this improvement, for it will mean that commerce which now cannot find room for its activities in the inadequate facilities of New York's docks and wharves will find room for enlarging its operations.

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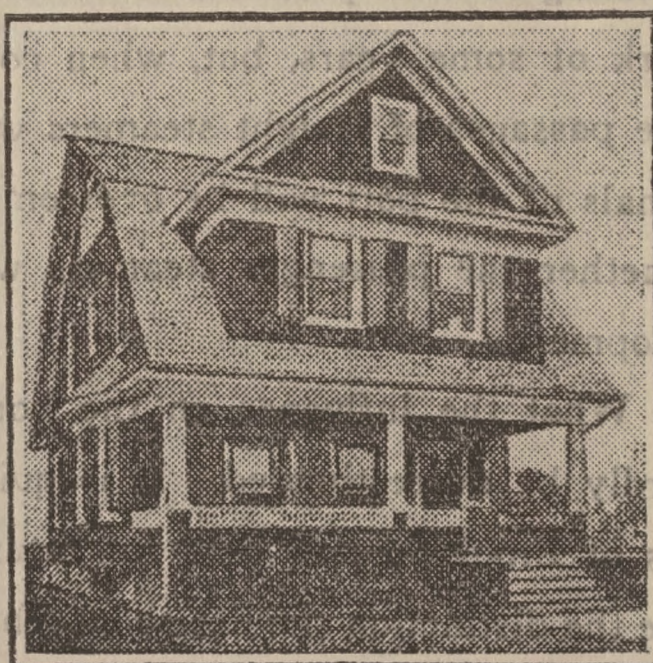
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The New Harbor at Jamaica Bay

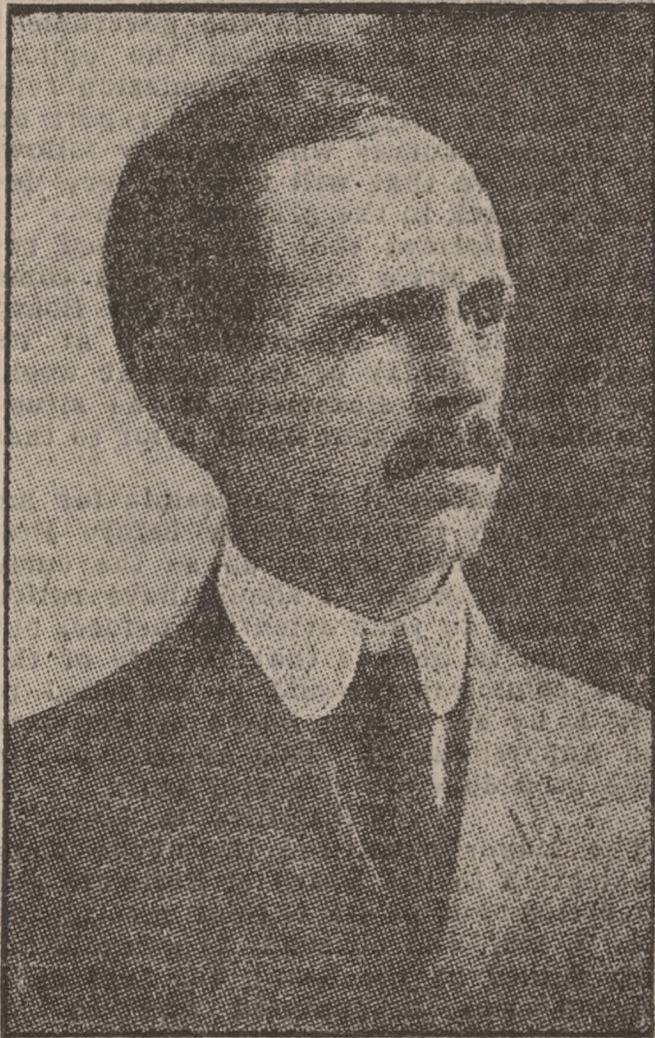
A Legislative History of the Project, by Hon. Charles B. Law, in the House of Representatives,

February 14, 1910.

Mr. Chairman—I desire to avail myself of the privilege accorded me by unanimous consent of the House to insert in the Congressional Record a statement of the genesis, history and status of the project to create a harbor in Jamaica Bay, New York, for which the rivers and harbors bill, now up for consideration in the House, provides an appropriation of \$250,500. I wish to dispel, if I can, the erroneous impression that seems to have prevailed on the part of some that the project is not for the immediate future, but for coming generations. I expect to be able to show to the satisfaction of those interested in the matter that if this project receives the support and co-operation of the City of New York, to which it is entitled and upon which its success depends, there is no practical reason that can be assigned why work cannot be actually commenced in the year 1910.

It is perhaps pertinent at this point to say a few words concerning the physical characteristics of Jamaica Bay and its geographical relation to the City of New York. The bay measures about six miles east and west and about four miles north and south. It is connected with the ocean by Rockaway Inlet and constitutes a perfectly sheltered harbor. It has a water surface of approximately 25 square miles with an entrance less than half a mile wide. Its waters are generally shallow but penetrated by natural channels radiating from the entrance toward various points on the shore. The expense of necessary dredging will be at a minimum because the material to be dredged will be principally sand and gravel and some clay. The reports of the United States Geological Survey show that no rock is to be encountered. The entrance to the Bay is about seven miles east of the Narrows and is readily accessible either from the ocean or from New York Bay. The New York Connecting Railroad skirts the shores of the bay and will connect with the Pennsylvania Railroad to the West and with the New York, New Haven and Hartford and the New York Central Railroads to the North and East. The bay occupies the southeastern portion of Greater New York and comprises more than one-fourth of the combined areas of the Boroughs of Brooklyn and Queens. It is surrounded by a vast territory of unimproved land and marsh land which can be acquired by the City of New York and reclaimed by the dredged material from the channels proposed to be constructed. According to the estimate of Hon. Edward M. Grout, former Controller of the City of New York, at least sixteen thousand acres of valuable land can be made by the City of New York, the value of which will be greater than the total cost of the improvement to the city. It is important at this point that we consider the facts and circumstances making

necessary further development and extension of the New York water front. An absolute need of increased water front and dockage facilities in and about the shores of New York has arisen, caused by the marvelous growth of that city during the past few years and the tremendous increase in the commerce of its port. According to the reports of the census taken in the year 1890, the present City of New York then had a population of 2,507,414. The census taken in the year 1900, shows a net increase of population during the ten years from 1890 to 1900 of 928,788. In ten years time this city added to its population more resi-



Charles B. Law.

dents than were in the year 1900 to be found in any other city in the United States, save Chicago and Philadelphia. The report of the New York State Census, taken in 1905, shows a total population for the City of New York in that year of 4,013,781, or a net increase of 576,579 over the population of 1900. Again in five years this city has added to its population more residents than in the year 1900 were to be found in any other city of the United States, save Chicago and Philadelphia.

The increase in commerce of the Port of New York has kept pace with its tremendous strides in population. During the thirty years between 1875 and 1905, the value of the imports and exports entered and cleared at the Port of New York practically doubled while the tonnage in foreign trade alone increased at a still greater rate. The total value of manufactured products in New York and Brooklyn in 1905 showed a net increase since the year 1880 of more than 100 per

cent. In his report to the chief of engineers, United States Army, Colonel John G. D. Knight, who had in charge the government surveys of Jamaica Bay, in discussing the future tonnage at the Port of New York, reaches his conclusion, after exhaustive study, in the following language:

"We can say that this tonnage will greatly increase and that it is thought that in ten years available water front for wharfage around Manhattan and in upper New York Bay will be exhausted. Provision for additional frontage must be made, which provision should be on New York Bay, if practicable, and Jamaica Bay affords the only site for such addition."

It was only five years ago that this scheme to create a harbor in Jamaica Bay was regarded by the vast majority of people as a mere dream so far as the present generation is concerned. It was generally believed that if the thing was done, it would be in the far distant future and for the use of future generations, and yet, it has happened during that five years period of time such practical progress has been made that now the initial appropriation of \$250,500 to commence actual work is being made by Congress and it is confidently believed that the City of New York will shortly make its initial appropriation of \$1,000,000 for the same purpose.

I believe that the people of Brooklyn will be interested to know the steps by which this progress has been achieved and the practical ideas that have prevailed in bringing about the result, and the purpose of this statement is mainly to give a concise history of the improvement.

After a most painstaking study and investigation of the subject I became convinced that the primary condition of success rested in a plan of co-operation as between the United States government and the City of New York. The reason for the necessity of such co-operation will be apparent upon considering the practical situation. It was obvious that the United States would not expend vast sums of money in dredging channels unless the general government could be assured that the City of New York would construct the docks and other appurtenances necessary to make said channels available for commerce. On the other hand, the City of New York would not, of course, construct such docks and piers without assurance that the United States would dredge the channels necessary to make them available for use. Hence was the absolute necessity of providing for a co-operative plan. Accordingly, in the winter of 1907, there was inserted in the rivers and harbors act of that year a provision directing the Secretary of War to cause a preliminary examination or survey to be made of:

"The waters of Jamaica Bay, including entrance to said bay at Rockaway Inlet, and those waters having their outlet in Dead Horse Inlet, with a view to framing a plan for their improvement and recommending the order of such improvement with the cost thereof, and to recommend the proportion of such cost to be borne by the city of New York; and the

Secretary of War is hereby requested to confer and co-operate with the Commissioner of Docks and Ferries of the city of New York, or with any other duly authorized agents, officers or representatives of the city of New York, and with any commission of engineers appointed, or who shall hereafter be appointed, to survey or examine said bay and to recommend to the city of New York plans for the improvement of said Jamaica Bay or the lands in and about said bay."

After drafting this provision and before it was submitted to the Committee on Rivers and Harbors of the House of Representatives, I submitted a copy of the draft to the members of the Jamaica Bay Improvement Commission, to which I shall make further reference hereafter, and in turn accompanied by two members of this commission, I called upon Mayor McClellan of New York and submitted it to him for his approval. At the close of this interview the Mayor heartily approved the provision, but expressed doubt as to the possibility of getting it enacted into law. It was, however, incorporated in the rivers and harbors bill which was passed and approved by the President March 2, 1907.

It is unquestionably true that the genesis of the movement, so far as definite and practical effort is concerned, is found in a communication on the subject addressed to the commissioner of the sinking fund of the city of New York, dated March 17, 1905, by Edward M. Grout, then Controller of the city of New York. The plans now under consideration for the improvement of Jamaica Bay follow the general recommendations contained in Mr. Grout's communication to rather a remarkable degree. Mr. Grout's communication closes with the following recommendation:

"I, therefore, request your consideration of the appointment of a commission to recommend plans for the development of the water front of the city outside of Manhattan Island, and especially of the development of Jamaica Bay."

Following the recommendation of Mr. Grout, the Board of Estimate and Apportionment of the city of New York, on March 2, 1906, passed a resolution authorizing the appointment by the Mayor of a commission of engineers for the purpose of reporting upon the general improvement and development of Jamaica Bay in the boroughs of Brooklyn and Queens, and also upon the condition of the water front of the city of New York other than that of Manhattan Island. Pursuant to this resolution, on April 26, 1906, the Mayor appointed Philip P. Farley, William G. Ford and John J. McLaughlin to compose the Jamaica Bay Improvement Commission. On May 31, 1907, the said commission submitted to the Board of Estimate and Apportionment of the city of New York a majority report, signed by Mr. Farley and Mr. McLaughlin, and a minority report signed by Mr. Ford. These reports were made prior to any conference with the Secretary of War, as provided in the said provision of the rivers and harbors act of March 2, 1907. The majority report recommended a plan estimated to cost approximately \$14,000,000; the minority report recommended a more elaborate plan, estimated to cost approximately \$47,000,000. These reports were based largely upon the assumption that the city of New York would make the improvement without federal aid, and have since been superseded by the reports of the same commission submitted December 27, 1909. The life of the Jamaica Bay Improvement Commission expired by limitation on June 1, 1907. Immediately thereafter and under date of June 5, 1907, I addressed the following communication to the Mayor of the city of New York:

"Hon. George B. McClellan, Mayor of the City of New York, Borough Hall, New York.

"My Dear Mr. Mayor—You will probably remember that in the month of

January I called upon you in company with William G. Ford, a member of the commission of engineers appointed by you on behalf of the city, to investigate the project for the improvement of Jamaica Bay, and at that time submitted to you a proposed provision to be inserted in the river and harbor bill, providing for a general survey of Jamaica Bay in co-operation with the city's commission of engineers, with a view to framing a plan to be carried out jointly by the city and the Federal Government. That provision was approved by you and was incorporated in the river and harbor bill. I enclose herewith a copy of said bill. Said provision will be found on page 47.

"I am informed that the city's commission of engineers has submitted its report to the Board of Estimate and Apportionment, making proper reference therein to said provision of the river and harbor bill.

"I am also informed that the life of the city's commission of engineers expired on June 1, and that no provision has been made for the extension of the life of said commission, for the purpose of co-operation and conference with the government engineers. If the life of the commission is extended or renewed, I believe there is no doubt that a joint plan can be agreed upon, and that the Federal Government will be prepared to bear a considerable portion of the expense. If the city's commission is not continued in existence and the government engineers are not afforded the opportunity to confer with a commission representing the city, an adverse report on the proposed survey will probably follow, and I believe that will mean a very decided set-back to the proposed plans.

"I am informed that the proposed report of the city's commission will come up for consideration before the Board of Estimate and Apportionment at its meeting on Friday of the present week, and I believe a statement of the situation should be in your hands prior to that date.

"Unfortunately it is impossible for me to call upon you personally before Friday, but I shall try to do so the early part of next week. I should have called this matter to your attention before, but I was led to believe that the life of the city's commission would be extended to July 1, by act of the Board of Estimate and Apportionment. This appears not to have been done. Yours very truly,

"CHARLES B. LAW."

The Mayor submitted the above communication to the Board of Estimate and Apportionment at its regular meeting on June 7, 1907, and pursuant to a resolution then passed by the board, the said commission was reappointed and to its original duties was added that of conferring with the Secretary of War relative to the survey or examination of Jamaica Bay and to recommend plans for the improvement thereof. It fell to Colonel John G. D. Knight, Corps U. S. Army Engineers, who was then district engineer in charge at New York, to represent the Secretary of War in the conferences with the Jamaica Bay Improvement Commission which began immediately after the reappointment of the commission in June, 1907, and continued up to the early part of the year 1909. In view of the results that have followed, I take a natural pride in the fact that it was my privilege to present the commission to the district engineer, the representative of the Secretary of War, and to inform him that the City of New York had clothed the commission with power to represent it in the conferences that were to follow. The conferences were had mainly with a view to agreeing upon the location of a principal channel, but also relative to distributing secondary channels through the collection of islands lying in the central portion of Jamaica Bay.

When a general plan for the improvement and the location of channels had been tentatively agreed upon, the actual surveys were commenced by the army

engineers in the spring of 1908, and were finally completed late in the fall of that year. Under date of January 30, 1909, the district engineer submitted his report based upon the general agreement between him and the Jamaica Bay Improvement Commission as a result of the conferences to which I have alluded. The joint plan embraced an entrance channel at Rockaway Inlet with a first depth of eighteen feet and width of 500 feet and a main interior channel extending from the southeast corner of Barren Island northerly and easterly skirting the westerly and northerly shores of Jamaica Bay to Cornell's Creek in Queens County, with a first depth and width to be the same as that of the entrance channel. As the needs of commerce may require both the entrance and interior main channels are to be deepened to 30 feet. The entrance channel is to have an ultimate width of 1,500 feet and the interior channel 1,000 feet.

The joint plan of improvement contemplates the use of the material dredged from the main interior channel to fill in behind the city's bulkhead, the purpose being to make valuable land for the City of New York, and to save the enormous expense that would be involved in taking the dredged material out to sea. In this connection arises one of the most striking and ingenious features of the report of Colonel Knight to the War Department, recommending that the dredging of the main channel be required of the City of New York, and that the city be reimbursed therefore at the rate of 10 per cent. per cubic yard, which is the cost of dredging the main channel as estimated by the majority of the Jamaica Bay Improvement Commission. The purpose of this recommendation was to avoid complications on the part of the City of New York with Government contractors, as such complications would be sure to arise if an attempt were made to co-ordinate areas of dredging with areas of fill at varying distances, each class from the other, the areas of dredging to be indicated by the government, and the areas of fill to depend upon the construction of embankments or bulkheads by the city.

The report of Colonel Knight submitted to the Chief of Engineers on January 30, 1909, was forthwith transmitted to the Board of Engineers for Rivers and Harbors at Washington. It contemplated an expenditure of \$8,610,050 by the government. It was considered at length and in detail at two sessions of the said Board. On February 16, or thereabout, I learned that the Board contemplated reducing the allowance to the City of New York for the dredging of the main interior channel to 5 cents per cubic yard. This would have meant a loss to the City of New York of approximately \$3,000,000. I also learned that in accordance with the custom of the Board not to make substantial changes in a report of a District Engineer without giving parties interested an opportunity to be heard, the Secretary of the Board had been instructed to communicate with the Mayor of the City of New York, notifying him that a hearing would be given on March 2, 1909. This would have made it impossible to secure any legislation at that session of Congress, which would adjourn on March 4, or only two days later. Fortunately the letter had not been mailed, and I succeeded in having the date of the hearing changed to February 23. Having secured this change of date, I immediately went to New York and conferred with city officials. The result was that at the hearing on February 23, the Mayor was officially represented by Nelson P. Lewis, Chief Engineer of the Board of Estimate and Apportionment, and the Jamaica Bay Improvement Commission was represented by William G. Ford. The result of the very effective arguments offered by Mr. Lewis and Mr. Ford, was that a compromise at 8 cents per cubic yard was reached, and a saving to the City of New York of \$1,770,000 was effected. As

modified by the Board of Engineers for Rivers and Harbors, the report of the War Department recommends that the Federal Government shall ultimately expend upon the project, \$7,430,050.

The Rivers and Harbors Bill of that session of Congress (1907) had already passed the House and the last meeting of the Committee on Commerce of the Senate for the consideration of the bill was held February 24. The report of the Board of Engineers for rivers and harbors was not available for inspection until the morning of that day. However, after inspection of the report, I was fortunate enough to secure a hearing before the Senate Committee, and succeeded in persuading them to adopt the following amendment, which was inserted in the Rivers and Harbors Bill of that year:

"The Secretary of War is hereby directed to report as soon as he is satisfied that the City of New York is prepared to undertake the work to be done by it preliminary to or contemporaneous with any dredging to be done by the United States government as recommended in the report and plan of the Secretary of War transmitted under date of February twenty-fifth, nineteen hundred and nine, for the improvement of Jamaica Bay, New York, and its entrance at Rockaway Inlet and Dead Horse Inlet."

The present appropriation of \$250,500 is based upon the following recommendation contained in the report of the Board of Engineers for Rivers and Harbors:

"The Board further recommends that the 18-foot entrance channel should not be dredged until the Secretary of War is satisfied that the City of New York is prepared to undertake its part of the general plan of improvement outlined above. The estimated cost of this channel for first development of 18 feet is \$250,500, and this is the amount of the first appropriation necessary under the conditions cited."

Immediately after the passage of the River and Harbor Act of March 3, 1909, the field of activity shifted to the state capital at Albany. From time immemorial, there had existed a sharp dispute between the state and the City of New York as to the ownership of lands under water in Jamaica Bay. Obviously the City of New York could not safely proceed with the dredging of the main interior channel and with the expenditure of millions of dollars in the improvement until it had absolute and undisputed title to the lands under water in Jamaica Bay. The settlement of this title had been under consideration for a dozen years by the corporation counsel and litigation in one form or another had been in progress for at least five years. It was conceded that the question of the title could not or would not be settled through litigation in the courts for many years yet to come. This meant the indefinite postponement of the improvement.

Accordingly, William G. Ford of the Jamaica Bay Improvement Commission drafted a measure to be introduced in the state legislature by which all the right, title and interest of the state in and to lands under water in Jamaica Bay would be ceded to the City of New York. I went to Albany with Mr. Ford and together we succeeded in putting the measure in such shape as to satisfy the State Land Office and the Attorney General. In its final shape it ceded the said lands under water to the City of New York for the purpose of creating a harbor, but, further provided, that the grant should become operative upon the government making its first appropriation for the creation of the new harbor, or upon the City of New York appropriating and setting aside a sum, not less than \$1,000,000, for the same purpose. The bill was introduced in the Assembly by Assemblyman Isaac Sargent, whose name it bears, and in the Senate by Senator Charles Alt. The bill was passed with comparative ease in the Assembly, but in the Senate great difficulty was experienced because of the constant interference of private interests owning upland about

Jamaica Bay and who wanted to get grants of land under water in front of their upland property. Amendments were twice injected into the bill in this manner. These amendments were not of themselves serious in their character, as they constituted only slight exceptions to the operation of the bill, but they were serious in obstructing the passage of the bill. The last amendment was thus injected into the bill on Tuesday of the last week of the session. As the Legislature adjourned on Friday and the reprinted bill had to lie on the desks three legislative days before passage unless the Governor interfered with an emergency message, it seemed at that time unlikely that the bill would succeed. However, on the following day, we appealed to Governor Hughes for his assistance. An emergency message from Governor Hughes certifying to the public importance of the bill and to the necessity of its immediate consideration by the Legislature resulted in its passage that day by the Senate and the adoption of the Senate amendments by the Assembly. The bill was thereafter returned to Governor Hughes by Mayor McClellan with his approval. It was, for a time, contended that the bill had not been returned by the Mayor within the constitutional limit of time. This view, was, however, overruled by the Attorney General and on May 28, 1909, the Governor summoned all parties interested in the bill to a public hearing on the afternoon of that day. A considerable number of private concerns owning upland about Jamaica Bay appeared by attorneys and otherwise in opposition to the bill on the ground that they had not made application to the Land Office for grants of land under water in front of their upland property and that the bill would prevent their securing such grants. Those of us who had been responsible for the introduction and passage of the bill, conceded that the effect of it would be to prevent such grants to private interests and that one of the main purposes of the bill was to prevent exactly that sort of thing and to save to the City of New York the enormous expense that would be involved in regaining title to such lands for general commercial purposes. We contended that the rights of the upland owners to access by water was subject and subordinate to the general purposes of commerce. This view prevailed and on the following day, May 29, 1909, Governor Hughes approved the bill with the following memorandum:

"State of New York,

"Executive Chamber, Albany.

"May 29th, 1909.

"Memorandum filed with Assembly bill number 2354 (Senate reprint, number 1633), entitled 'An Act to grant to the City of New York certain lands under water in Jamaica Bay and vicinity.'

"APPROVED.

"This bill bears the indorsement of the Clerk of the Assembly that it was transmitted to the Mayor of the City of New York on May 1, 1909. It was received by me, on its return, on May 17, 1909. I am informed by the Mayor that the bill was actually delivered to him on May 3, 1909. Under the opinion of the Attorney General that the time for its return is to be computed from the date of such delivery, I have acted upon the bill. The certificate attached to the bill does not show the assent of two-thirds of the members elected to each branch of the Legislature. But I am advised that such assent was in fact given and is shown by the record of both Houses.

"This bill is designed to enable the City of New York to co-operate with the Federal Government in the creation of a new harbor in and about Jamaica Bay, including the making of channels, basins, slips and other necessary adjuncts and, as the bill recites, to secure 'the advancement of the commercial interests of the state and nation.' For this purpose the grant is made to the City of New York of such right, title and inter-

est as the State of New York may have in and to the land under water in Jamaica Bay and Rockaway Inlet, and the tributaries thereto, as stated. The bill provides that the grant 'shall become operative upon the United States Government making its first appropriation for the creation of the new harbor mentioned in this act, or upon the City of New York appropriating and setting aside a sum not less than one million dollars for the same purpose.'

"It is of manifest importance that provision be made for the proper protection of the public interest in and about the waters of New York, and that the necessary and important developments of the future should not be retarded or made more expensive to the community by failure at this time to take suitable steps to safeguard the public right. It may be regretted that the bill contains any exception to its operation. But this is not a reason for its disapproval, for further delay will permit still more numerous exceptions and detract from the public opportunity which should be provided.

"(Signed)

"CHARLES E. HUGHES."

Mr. Ford and I had spent about three weeks at Albany in securing passage of this measure, and its final approval by the governor of the state removed one of the most serious obstacles in the way of prosecuting the project. I believe few have realized the importance of this measure and the strenuous character of the fight that was waged for its enactment.

The report of the War Department, heretofore referred to in detail, was submitted to Congress on February 26, 1909. This report was based upon a general agreement or understanding between Colonel Knight, the district engineer, and the Jamaica Bay Improvement Commission, as a result of the long-continued conferences to which I have heretofore alluded. The substance of this understanding was that the Federal Government should dredge the entrance channel and should reimburse the city to the extent of 8 cents per cubic yard for the dredging of the main interior channel.

It will thus be seen that the general government exercises no jurisdiction in connection with this improvement inside the bulkhead line as determined tentatively by the United States district engineer and the Jamaica Bay Improvement Commission. What should be done inside and from this bulkhead line in the way of the construction of docks and piers and auxiliary basins, or the reclamation of land, was left to the City of New York subject only to the recommendation that the eighteen-foot entrance channel should not be dredged until the secretary of war was satisfied that the City of New York was prepared to undertake its part of the joint plan of improvement. It will thus be seen that the report of the government's district engineer, approved by the secretary of war and submitted to Congress on February 26, 1909, subject to the changes I have indicated as to the amount to be allowed for the dredging of the main interior channel, was a report concerning the part of the joint plan of the improvement to be undertaken by the general government outside the bulkhead line, leaving the Jamaica Bay Improvement Commission to report to the City of New York what it should do inside and from the bulkhead line in the way of carrying out the joint plan of the improvement.

The report of the district engineer and the secretary of war as to the part of the improvement to be undertaken by the general government having been made as a result of the aforesaid conferences, it was then plainly in order in pursuance of said general arrangement, for the Jamaica Bay Improvement Commission to report to the City of New York recommending plans for improvement inside and from the bulkhead line and the cost thereof.

Accordingly, during the early part of the summer of 1909, the Jamaica Bay Improvement Commission recommended that the City of New York should appropriate \$75,000 to be used for expenses of the Commission, including the prosecution of field work in Jamaica Bay necessary to determine with precision the location of the harbor lines agreed upon tentatively between the City of New York and the United States Government theretofore shown graphically only, the determination of quantities involved in the excavation, the filling in of the lands, building of bulkheads and in acquiring the other necessary data upon which to base a more definite report. The appropriation was promptly made by the Board of Estimate and Apportionment and confirmed by the Board of Aldermen. The work went steadily on during the summer and fall of 1909, and on December 27, 1909, the Commission again submitted a majority report signed by Mr. Farley and Mr. McLaughlin, and a minority report signed by Mr. Ford. Both reports are favorable to the plan of co-operation with the United States government but differ materially as to scope and detail. I think the main points of difference in the reports can be best stated in the parallel form as follows:

Recommendations as to procedure for the near future:

FORD REPORT.	FARLEY - McLAUGHLIN REPORT
(1.) Creating preliminary 18 ft. main channel throughout entire length, giving the Borough of Queens access to the sea as well as the Borough of Brooklyn.	(1.) Creating preliminary 18 ft. main channel only part of the way, to the exclusion of the Borough of Queens.
(2.) Disapproves the selection in advance, and consequent advertisement of one spot in the Bay to the exclusion of all others, for high class development at the expense of the city, prior to the purchase of the adjacent lands at a fair but not exorbitant price.	(2.) Select at this time for future high development at expense of the city one particular spot in the Bay to the exclusion of all others, no part of which is owned by the city.
(3.) The connection of the 18 ft. main channel with the entire adjacent shorefront, after having developed, for commercial enterprises, some spot or spots, to be selected hereafter.	(3.) Silent as to this.

The difference in cost to the city for dredging the four miles of the preliminary 18 foot channel beyond where Messrs. Farley and McLaughlin would

stop it would amount to about \$150,000, and would give Queens Borough an outlet.

While it may be regarded as my duty to continue my official activity mainly to the Federal end of this enterprise, nevertheless, as a citizen of Brooklyn I certainly am entitled to take an interest in the city's plans in meeting the Federal government the same as I took an active part and interest as a citizen in the Sargent bill at Albany, and I do not hesitate to say that, while both reports are commendable in character, I believe it would be a serious error to select in advance any one locality in the Bay for high class development until the city has acquired the lowlands about the Bay which will be required for the purposes of the improvement. I think that the selection of such locality or localities for special development before the city has acquired such lands would result in unnecessary expense to the city. I am also of the opinion that Queens County should not be left out of account and that the 18 foot main interior channel should be carried around to Cornell's Creek in Queens County. The city is dealing with a big project, and, while proceeding with caution and due regard for reasonable economy, it should remember that the money devoted to this project is an investment for the city rather than an expenditure. I am very much gratified to learn that the Board of Estimate and Apportionment of the City of New York is now unanimous in favor of appropriating a large sum of money to start this splendid work of public improvement.

Thus it appears that after five years of persistent effort the success of the plan to create a harbor in Jamaica Bay is assured by the certainty of large appropriations by the Federal Government and the City of New York, respectively, to carry out a co-operative plan.

As I look back upon the history of the unusual events that have culminated in the practical success that is now assured, I am disposed to think that while obstacles have been encountered at almost every step of the way, the greatest difficulties of all were encountered in getting the thing started. When I first took my seat in Congress in December, 1905, I found that few, if any, of the members of the committee on rivers and harbors of the House had ever heard the name of Jamaica Bay. At the very start I had numerous talks with the distinguished chairman of that committee and tried by all conceivable means to get him interested in the matter. I finally decided that the only way in which I could impress the rivers and harbors committee was to secure a hearing for a delegation of public spirited citizens from Brooklyn who were blessed with enough of the spirit of optimism to believe the thing to be a possibility. The hearing was arranged during the winter and Brooklyn responded in a manner I shall never forget. To the men who took part in these early efforts at Washington the greatest credit is due. Among them were such men as Henry A. Meyer, Adolph Kiendl,

John R. Corbin, John B. Creighton, Terrence F. Curley, John O'Connor, Elwin S. Piper, and a number of others whose names I do not now recall. The committee had limited us in advance to one-half hour's time. So earnest, however, were the pleas of the men who came down from Brooklyn and so impressive were their arguments that nearly two hours time was readily conceded and consumed. Although there was no regular river and harbor bill at that session, the result of these hearings was the passage of a special bill providing for a survey with a view to estimating the cost of dredging the Coney Island channel to a depth of 20 feet and a width of 600 feet and with a view to estimating the cost of an entrance channel into Jamaica Bay with the same depth and width. This was only one of two bills reported out of the river and harbor committee that year. The result of the survey thus authorized was the subsequent appropriation of \$188,300 for the Coney Island channel. The report on the survey for the entrance channel to Jamaica Bay was adverse in its character mainly on the ground that the cost was found to be excessive when disconnected with any plan for the improvement of the interior of the bay. The subsequent survey for both entrance and interior channels provided for in the river and harbor act of 1907, overcame the set-back that was experienced with reference to the 1906 survey for the entrance channel. There is no doubt whatever now that success was dependent upon uniting the plan for the improvement of the entrance channel with the plan for the improvement of the interior of the bay.

It may also here be remarked that the one important result of the hearings before the rivers and harbors committee during the winter of 1905 to 1906, was that the chairman of the committee, Theodore E. Burton, now United States Senator from the State of Ohio, became sufficiently interested in the claims made so that in the summer of 1906, upon my invitation and the invitation of the men I have above referred to, he came to Brooklyn and made a thorough personal inspection of Jamaica Bay. I believe that Mr. Burton's personal inspection of the bay was a matter of the greatest importance in subsequent events.

It may perhaps, in conclusion, be pertinent to say that next to the matter of making the start, the greatest difficulty that has been encountered has been the spirit of pessimism, or at least the lack of optimism, that was for so long a time so widely prevalent. The optimists are now in the vast majority, but during most of the past five years they have been in a strange minority. In this connection, I desire to emphasize the fact if we people of Brooklyn desire to see the ultimate achievement of this project that means so much to her future and to the coming greatness of our borough as well as of our city, we must have an abiding faith and confidence in the possibilities that are plainly in sight and an abiding faith and confidence in our ability to achieve success.

Why Jamaica Bay Should Be Improved

By Henry A. Meyer, President of the Jamaica Bay Improvement Association.

Henry A. Meyer has been an indefatigable worker for the improvement of Jamaica Bay. As president of the Jamaica Bay Improvement Association he has given a great deal of time to the effecting of proper legislation for the improvement. Mr. Meyer made an exhaustive study of foreign harbors and shipping during a month's visit of Europe in 1909.

To my mind the proposed improving of Jamaica Bay as a commercial port in connection with New York's dock system, is just as necessary to the state and city of New York, as it is necessary that man eat to live. The proof of necessity lies in evidence, and where more positive evidence of the necessity of the improving of Jamaica Bay "than the clamoring of New York's commerce for increased docking facilities."

We are informed on reliable authority, by those who are well versed on port of New York statistics, that much commerce now encouraged to other seaboard cities was only lost on account of New York's inability to provide adequate docking accommodations, this to our shame and disgrace when we consider how unusually nature has favored us with so ideal an opportunity as offered by Jamaica Bay, which, with but little developing, and at less cost than authorized for the Erie barge canal, has in it the making of a most magnificent land-locked harbor, capable of assuring to New York forever pre-eminence as the commercial port of entry of our country.

The minority report of the Commission appointed by Mayor McClellan to report on the feasibility of improving Jamaica Bay as a port-of-entry, proposes a reclamation of 13,000 acres of marsh land into good tenantable land, this divided up into 20x100 foot lots means that the city would have 220,000 city lots to dispose of, or hold, just as it saw fit. The making of this land alone would be more than sufficient to pay for the entire proposed improvement.

Secondly, the Commission provides for 153 miles of wharfage, while it would not be necessary to build that amount of wharfage at once, I am sure commerce would so expand with an improved Jamaica Bay as a commercial port that dockage could not be rapidly enough provided. It would thus be paying for itself at the very inception. In order to make good my assertion as to the great

demand for dockage at Jamaica Bay, permit me to give a few positive facts: Take for instance the building operations of the sections bordering on Jamaica Bay, the Twenty-fourth, Twenty-sixth, Twenty-ninth and Thirty-second wards in the Borough of Brooklyn; the Building Department records show that 4,786 buildings, at a cost of \$26,000,000, were erected in these four wards in the year 1907. When we consider that every stick of timber, yes, I dare say, every bit of building material used in this vast building operation, was either trucked from the Wallabout, Gowanus or Newtown creeks, one can easily grasp the urgent need of dockage nearer at home.

I have often seen building operation in the Twenty-ninth and Thirty-second wards cease entirely for the reason that material firms refused to deliver on account of distance. The same conditions exist in Queens Borough of our city where it borders Jamaica Bay, as at Jamaica, Woodhaven, Morris Park, Springfield, Rosedale, Far Rockaway, Arverne and Rockaway Beach, all depending on long hauls of delivery by railroad. Is it then not strange that we have not been more alive to the possibilities of a Jamaica Bay harbor ere this?

In the Twenty-ninth, Twenty-fourth, Twenty-sixth and Thirty-second wards of this city in 1907, 1908 and 1909 the number of buildings built were 10,348, at a valuation of \$67,500,000. Taking these figures and approximating freight on the building material used, there would be about \$500,000 saved if freight were discharged direct on docks in the neighborhood instead of lightering, transferring and exchanging freight in order to reach their destination in these wards. One of the great drawbacks of the city of New York has been excessive terminal charges. The situation will be relieved fifty per cent. where outgoing ocean steamers can receive and deliver freight directly from the cars, especially as regards grain and

live stock. The saving in expense on these two items alone would in a few years more than cover the cost of the initial improvement.

No greater improvement that the State of New York could foster or participate in would guarantee to it the benefit and profit assured by an improved Jamaica Bay.

It is absolutely necessary that some provision be made for a seaboard terminal that will care for the increased canal-barge traffic that will be developed by the Erie barge-canal now under construction; and where a more ideal location than Jamaica Bay harbor?

The best proof that Jamaica Bay stands out as the most central seaboard terminal is the fact that the Pennsylvania Railroad, and such roads as E. H. Harriman was interested in, have all planned for great terminals at Jamaica Bay, where it is made practicable to bring rail and shipping interests in direct connection, thus doing away with the now costly and burdensome intertransportation charges. It is only such connecting features that will forever assure the future expansion of commerce.

I have had opportunity of visiting such great harbors as those of Hamburg, Bremen, Rotterdam and Liverpool. All these ports, as you are aware, are located from fifty or sixty miles from the ocean, every foot of which must be continually dredged to permit vessels to reach their landings. Compare such conditions as against the possibilities of magnificent Jamaica Bay connecting directly with deep ocean waters. The creation of Jamaica Bay as a commercial port would effect a saving of five hours time under the most favorable conditions, and from one to two days in heavy fogs or snow storms over the present route in the time taken for the trip between European ports and New York. Ask the captain of any Atlantic liner, and he will surely say that the most dangerous part of the whole voyage across "is the trip from Sandy Hook to

the New York dock"—all to be done away with an improved Jamaica Bay.

There are nine reasons why Jamaica Bay should be improved:

First. Jamaica Bay is the ideal location for an ocean terminal, offering, as it does, a safe harbor with a good inlet and outlet to the ocean.

Second. Jamaica Bay will amply provide railroad facilities for railroads to all parts of our country.

Third. Jamaica Bay will enable shippers and manufacturers to obtain transportation at the lowest possible cost.

Fourth. Jamaica Bay would enable the State of New York to regain the commerce which rightly belongs to it. Ocean liners and canal barges would be brought

in direct contact, thus saving great cost of loading and unloading.

Fifth. Jamaica Bay will furnish 163 miles of additional dockage to New York City's dock system, which is more than all the combined shore line of all the boroughs of the City of New York.

Sixth. Jamaica Bay offers exceptional opportunities for warehouses and factories.

Seventh. Jamaica Bay can be connected at comparatively small cost with the Harlem River by a waterway to Flushing Bay, and with the Hudson River by the proposed Coney Island canal.

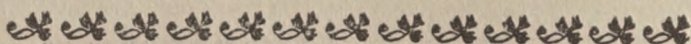
Eighth. Jamaica Bay stands out as a central location for a seaboard terminal for railroads. This is evident from the

terminal planned by the Pennsylvania Railroad and Harriman railroads.

Ninth. Jamaica Bay will bring together water and railroad transportation at a central location that will accommodate them all.

Without question, the improved Jamaica Bay forever spells the destiny of the City of New York as being the greatest metropolis on earth. Because, of natural location, the Jamaica Bay will be a new door to the nation, which will have such an effect on the growth of the surrounding country as to increase its population a hundred fold.

Let us hope for an early realization of an improved Jamaica Bay as the best and greatest harbor in the world.



PARTY OF BROOKLYNITES AT JAMAICA BAY IN 1905



From Left to Right, Top Row—Henry A. Meyer, Henry W. Dryer, John R. Corbin, Henry Asserson, Lewis H. Pounds, Arthur O’Keeffe, E. Strong, Alfred E. Steers, John B. Creighton, John F. Dryer, John O’Connor, Mr. Fleming. Lower Row—F. J. H. Kracke, Senator Marshall, Mr. Breckenridge, Charles B. Law, E. M. Bassett, William H. Goldey, Terrence Curley.

History of Jamaica Bay

Written by Noyes F. Palmer, in 1906.

In the State Library is an original map, made in 1666, which was obtained by the late Senator H. C. Murphy while United States Minister at The Hague. A copy of this map was published in Volume 14, "Documents Relating to the Colonial History of the State of New York," relating to a period from 1630 to 1664.

The water now designated as Jamaica Bay was designated on that map as Canarsie Bay. At the date of this survey, 1666, there was no inlet from the sea into Canarsie Bay, except one east of a line drawn south from the present Woodhaven lane, at Jamaica, or about the eastern end of the bay, about where the Arverne Hotel is now situated.

In 1776, when Lord Howe and the British and Hessian troops took possession of New York, his engineers made a map of this Canarsie Bay and designated it Jamaica Bay. This was the first use of the words Jamaica Bay. This map of 1776 shows two inlets from the Atlantic Ocean into Jamaica Bay. The eastern inlet was at a point due south of Titus Titus Mill, now known as the Van Wicklen Mill, on Spring or Third Creek. The other inlet was about due south of the old Town Hall of Flatlands.

In 1797, about the time of the organization of the State of New York, various maps were made, showing the limits of the towns of Jamaica, Flatbush and Flatlands, bordering on this bay. The Stewart map of the town of Jamaica shows the town line on the west, as extended from a cedar tree on the hills of Newtown, passing through Betts' Tavern, John I. Snediker's of modern times, and thence in a straight line through the mouth of Spring Creek and out through The Gut into Atlantic Ocean. This line was also the boundary line of Kings and Queens counties. This survey of the town of Jamaica, 1797, designated that portion of the bay as Jamaica Bay.

The map of the town of Flatbush, by Jeremiah Lott, designated the waters bordering on that town as Flatbush Bay, and a map by the same surveyor of the town of Flatlands designated the waters bordering on that town as Flatlands Bay. These three town surveys were made to conform to the original ground briefs, or first title, when the freeholders purchased from the Indians the fee of the lands and of the lands under water from the "hills to the sea."

By the Stewart map of the town of Jamaica, in 1797, the eastern inlet was about where the Lord Howe map had it in 1776. The Jeremiah Lott map of Flatbush shows an inlet about due south of Fresh Creek (First Creek). Tradition and testimony of many old inhabitants say the Stewart Inlet, called the Gut, closed up and another inlet formed a mile to west and eventually the inlet, as shown on Jeremiah Lott map of Flatbush, was straight out to the sea in front of Barren Island.

I have talked with two old men of the Jeremiah Lott family, who say that when

boys they walked on Barren Island, to the seashore and eastward for a mile, where the inlet was, about 1836. The same old men say that they were present on Barren Island the night of a great storm when a new inlet cut through Barren Island. The gradual growth of Rockaway point to the westward has carried this inlet a mile farther west than it was in 1836, so that instead of going straight out to sea on the east corner of Barren Island, it is now necessary to sail between Barren Island and Rockaway Bay to the west and go out to sea about in front of the Brighton Beach Hotel. So much for the shifting inlet.

All maps of Jamaica Bay show a body of water between Rockaway Beach and the land shores of the bay. And the first maps and records show these shores were first settled by the early Dutch. The first reference in the Dutch Annels refer to meadow lots on the First, Second and Third Creeks emptying into the bay, long before any maps of allotment were made of the planting lands or wood lots. The last Dutch governor, Stuyvesant, owned a farm in the town of Flatlands, not far from the head of Bedford Creek, and Captain Schenck, a friend of the Dutch governor, had a special order from the governor to trade in furs from the Canarsie Landing to Holland—as great a privilege as had the Dutch captains from New Amsterdam sailing from Bowling Green. The uplands in the towns were Indian corn lots or wood lots, and these were laid out subsequent to the survey and map of the meadow land on the basis of ratio of meadow area previously allotted. The bays and creeks of all the Dutch colonies of Kings County, were the primary source of living and revenue. These bays and creeks were the only means of collecting revenue. Corn mills were at the headwaters and Fly Boats sailed in and out to the seat of government in New Amsterdam. So important were these creeks that on the maps of 1666 are shown the canals dug through the meadows, to Gravesend Bay from Canarsie Bay, to avoid going out to sea. It would seem that the present generation should have the same privileges. As a matter of fact it is one of the mysteries of political government that Jamaica Bay has been lost to commerce, whereas two hundred years ago it was the means of making the old Dutch land owners the real factors in politics. It is a matter of political history that two generations ago the farmers were the bosses, and not until 1886 did the former towns of Flatbush, Gravesend, New Utrecht, Flatlands and New Lots begin to pass into city politics.

So far as I know, there is but one public dock in the entire limits of Jamaica Bay. And this one dock and landing place was acquired in 1848, at the foot of Eldert Lane to Van Wicklens Mill—an inland dock at the head of Third Creek. There was another public landing place established at Canarsie, and designated as Schencks, in 1797, and referred to in the Dutch Annels. It is a well known fact the Canarsie Landing was used as early as 1664, and before that. No one now living has ever known when there was not

a landing place at Canarsie. A multitude of deeds in the Canarsie section all refer to the "Road to the Landing." The records show that in 1704 there was a "road and landing place" at Canarsie, and to be there forever.

As a matter of fact, Mr. Littlejohn, who built the Canarsie Railroad, found this old dock and landing in 1866 and kept possession of it. His successors have it now. The commissioners map of Brooklyn calls for three large basins, or water ways, from Jamaica Bay up into principal land sections, and by Chapter 351, Laws 1893, more than one-half of Jamaica Bay was placed on the maps of the City of Brooklyn. All of these should be bulkheaded and dredged out, for purposes of navigation and sewer drainage. This would reclaim thousands of acres of land now not fit for habitation and increase the assessed valuation of the city far beyond our imagination. All that is lacking are channels and bulkheads.

By Frederick Van Wyck.

Further facts about the history of Jamaica are contained in a letter addressed to the controller of New York City, Edward M. Grout, by Frederick Van Wyck, on November 28, 1904. He goes on to say:

"It is believed that with the exception of the most northerly island of the tract, known as Crooke's Island, these lands were never assessed to any owner by the Town of Flatlands. About twenty years ago some small cottages were erected on an island in the southerly part of the tract, and it is said that grants were afterward obtained from the land commissioners for small portions, not contiguous to any upland and far removed therefrom. About ten years ago a claim was posted up in several parts of the tract by certain members of the Lott family at Flatlands. I do not hold any retainer on behalf of any private interest and write only as an inhabitant of Flatlands. From historical investigation the situation appears to be this:

"There is a Dutch patent or ground-brief, dated in June, 1636, recorded in the Secretary of State's office in Book G. G. of Translations from the Dutch, at page 34, to Andries Hudde and Wolphert Geritsen (Van Kouwenhoven) of the whole of Flatlands exclusive of Flatlands Neck, Canarsie and Bergens Island, described as extending from 'a certain valley' (low ground) to the woods.

"In a Journal of a Voyage to New York and a Tour in several of the American Colonies in 1679-80, by Jasper Dankers and Peter Sluyter of Weiwand in Freisland, translated from the original manuscript in Dutch for the Long Island Historical Society and edited by Henry C. Murphy, Foreign Corresponding Secretary of the Society," constituting Volume I. of the Memoirs of the Long Island Historical Society, beginning at page 117, a very full description is given of certain parts of the present Borough of Brooklyn, including Flatlands, and particularly this tract of low ground or 'valley.' Under entry of October 11, 1679, it is noted:

"There is towards the sea a large piece of low flat land which is overflowed at

every tide like the schorr (marsh) with us, miry and muddy at the bottom, and which produces a species of hard, salt grass or reed grass. Such a place they call the valley and mow it for hay which cattle would rather eat than fresh hay or grass."

"Then follows a description of the uplands at Flatlands, both as cultivated and as used for pasture. The large tract of firm, salt meadow lying northeast of the village of Flatlands is also carefully described and distinguished from the so-called 'valley.' Certain natural objects, such as the grove still standing at Bergen Beach, locate this last mentioned firm meadow or heath very definitely. The description of this last-mentioned salt meadow in the Journal of 1679 is as follows (also under entry of October 11, 1679):

"There is also a tract which is somewhat large, of a kind of heath on which sheep could graze though we saw none upon it. This meadow (schorr), like all the others is well provided with good creeks which are navigable and very serviceable for fisheries. There is here a grist mill (late known as Crooke's mill) driven by the water which they dam up in the creek * * *. In the middle of this meadow there is a grove into which we went and within which there is a good vale cleared off and planted."

"There is an Award of Arbitrators, dated February 13, 1695-6, recorded in Kings County Register's Office, Liber 2 of Conveyances, Page 82, settling certain matters in controversy between the inhabitants of Flatlands and the succes-

sors in interest of Hudde and Van Kouwenhoven, in relation to the boundaries of the above-mentioned ground brief. In that award it is adjudged and decreed, among other things, that the 'valley' was included within said ground brief and belonged thereto.

"I believe that it is under this award, supplemented by an Indian deed, known as the Barren Island deed, a copy of which is published in Styles' History of Brooklyn, topic, Flatlands, and a confirmatory patent from the English government, dated November 1, 1667, recorded Secretary of State, office book 1, page 91, that private ownership to this tract, always excepting Crooke's Island, is claimed.

"With the exception of Crooke's Island, it is probable that prior to the above-mentioned occupation, taken about twenty years ago, of small portions of the tract, no possession was had of the property for over a century or perhaps two, provided, however, that if the Barren Island Indian deed can be shown to include that tract, the unquestioned possession of that island may extend to the whole tract.

"The English town patents of Flatlands, dated one October 4, 1667, and the other, March 11, 1685-6, recorded in Secretary of State's office, in book 4, of patents, page 44, and book 5, page 300, respectively, were probably sufficient to carry the title to this tract of low lands or lands under water, to the Town of Flatlands, if such lands were not then held in private ownership under the Dutch ground brief.

"If, as may be readily suggested, the

Dutch sovereignty had no power under the civil law to convey the title to lands under tidal waters to private owners, and the lands in question answer that description, the title would appear to have passed to the Crown of England and thence to the Town of Flatlands, prior to said confirmatory patent, and may now be in the City of New York as successor of that town.

"On the other hand, if the lands in question, although overflowed at every tide, or at some tides, are not technically lands under water within the meaning of the civil law, and if that law favored the granting of such lands to private owners and the reclaiming thereof by such owners, as was doubtless the case with marsh lands in the Netherlands, and perhaps also in Louisiana, and it is determined that the title is in the descendants or successors in interest of the Dutch patentees, would it be proper to ask your advice in the matter of an immediate application to the city to take these very cheap lands now, by eminent domain, and control them either for commerce or pleasure?

"If the city owns the lands, adverse possession may run against it in a short time, if it has not already run in respect of certain small portions of the tract.

"Permit me to suggest that the time cannot be far distant when business enterprises such as those on Newtown Creek and at Carteret will seek to occupy these lands and that an early determination by the city of its position with respect to them would be a great local benefit of Flatlands.

Jamica Bay Needs 30 Foot Channel.

By Calvin Tomkins, Commissioner of Docks, New York City.

"I consider this improvement of vast significance to the City of New York. If it is possible ultimately to maintain a 30-foot channel in Jamaica Bay or a deeper channel, the Jamaica Bay improvement will be a revolutionary event in the development of the city. If it is not possible to maintain more than the 14-foot channel that exists now, nevertheless that large area of land and water will be of the greatest value to the city as an industrial railway terminal with the barge canal equipment.

"I think that the former possibility is likely to come about. I believe we should look at this thing in a very practical way. I don't think that the improvement of the bay, in the manner that the city will probably undertake it, will go ahead with a great rush, I don't believe the city will have the funds to do it that way, but I think the city will decide to make a start, and the first use to which the bay will be put, it seems to me, will be a use like that to which Gowanus and Newtown Creeks were put, providing facilities for obtaining cheap building material to build up the city coal and

coarse freights, and introducing an opportunity of industrial development by feeding raw materials to the factories which will go there. I believe factory developments should go on coincidentally with the terminal development, and that we should plan to build a terminal as distinguished from a mere waterfront; that is, with warehouse equipment and railway equipment as well as docks.

"I believe that the railway development should be under the control of the city. If the opportunity of such a general railway terminal is not availed of, it will be very difficult to provide it later.

"At the present time Jamaica Bay is about as near to the New Jersey system of railroads as it is possible to reach with the tunnel grading. You can do it for passengers, but you cannot do this advantageously for freight in Manhattan. It looks as though we will have to continue to depend upon the car float in Manhattan and South Brooklyn, as distinguished from the switch, and this is a permanent handicap, direct railway connection, of course, being cheaper.

"Back of the warehouses, there should be located factory sites, and here is a great opportunity for private development. I believe the street system and the local railway terminal system should

be so planned as to make it possible to connect every future factory site with the waterfront terminals. That is what they are planning to do in New Jersey and it is the key to the New Jersey situation.

"The overshadowing consideration, to my mind, is that of keeping the city ahead of the speculator. If we are to have an economical development and a quick development, the city must place itself in the position which the speculator usually occupies, and by so doing avoid stumbling over its own tracks by raising values.

"The working out of the entire waterfront development depends on the acquisition of property in such a way as to facilitate the further acquisition of property.

"I believe that ultimately, if the city acquires these waterfront lands, the development will be greatly stimulated, because the basis for utilization—the rent paid—will be lower than it would be under any private system, based upon progressive speculative advances.

"The majority and minority reports of the Jamaica Bay commission are in pretty fair agreement as regards the shore development. As regards the interior development, they are not, but that is not a material question at present, and we have plenty of time for consideration."

Remarks Before the Barge Canal Terminal Commission

By N. B. Killmer, Secretary of the Jamaica Bay Improvement Association.

Gentlemen of the Commission:

The title of the act that called you into existence says that you are to inquire into the question of providing terminal facilities on the canals of this state, with a view of ultimately improving and fostering the commerce of the state. Section 1 of this act states that it shall be your duty to visit and inspect not only the various harbors connected with the canals, but all harbors in this state where freight carried on the canals may be either received or discharged.

In the report which you are to make to the Legislature, your findings and recommendations shall include the place where, in your judgment, special facilities for receiving and discharging canal freight should be provided, the securing of available sites for terminal structures, amount of land necessary to be taken at each point for such purposes, etc.

The reason for the enactment of this law was, of course, plain and unmistakable. The state has undertaken, by the expenditure of a large sum of money, a great public work that was destined to benefit not only her own people, but also a large section of the country, by the improvement and enlargement of her waterways, and thus create a highway of commerce that would furnish transportation for the products of the West and the Northwest to tide water. The expenditure of more than one hundred millions would be practically useless and would utterly fail to accomplish the purpose desired, viz., "the improving and fostering of commerce," unless something additional was done. What that something was is clearly stated by the superintendent of public works, Mr. Stevens, a member of this commission, in his report to the Legislature, wherein he says: "Adequate terminals are prerequisite to the proper handling of traffic, and any waterway which does not possess terminal facilities will almost certainly be doomed to failure." Therefore, because of this need of terminal facilities, and for which the expenditure by the state of one hundred and one million dollars had not provided, although absolutely necessary in order to secure the benefit to the state, your commission was appointed. My object in reminding you of reasons for which you were created is for the purpose of impressing upon your minds the real work that you have undertaken to do. It is not, as I understand it, the commission's duty simply to go to Buffalo, Tonawanda, Albany, Poughkeepsie or New York City and select a dock here and there that a canal boat may tie up to; but it is to find a location and site where, in its judgment, special facilities for receiving and discharging canal freight could be provided, to the end and for the purpose of im-

proving and fostering the commerce of the state over the new waterway.

If only a partial success attends the enlarging of the canal and it secures but a minimum amount of business in tonnage, and it is utilized to only a fraction of its capacity, it will mean a very large increase in the tonnage. But the friends of the canal estimate that in a very short time it will bring annual tonnage to this port of at least ten million tons, more than double that of any previous year; but it must have adequate up-to-date terminal facilities to secure the business, and then to take care of it.

A big ditch across the state, with the same kind of terminal facilities as have been furnished heretofore, will not do it. According to many who think they are competent to judge, the enlarging of the canal will not increase the business at this port one iota unless the terminal facilities at this port are radically changed. They assert that the congested docks and piers, compelling three persons to do business in a space designed for two, and at rates much higher than at other ports because of this congested condition, and the extra expense of handling, hauling and rehandling involved, make the cost of through business much higher than at other ports, and hence the driving of business elsewhere.

General Clarkson, the surveyor of the port, in a recent statement to the Maritime Association, said: "In twenty-one years the exportation of grain has fallen from 114,000,000 to 34,204,054 bushels. In export of corn alone last year this port lost 16,000,000 bushels. The main factors in driving away the city's export trade have been New York's high charges for wharfage and the neglect to provide terminal facilities. Whereas berthing space here costs from \$60 to \$75 a day, Boston, with a more enlightened policy, provides free wharfage for all steamships, and by state legislation has created a system of railroad terminals at piers, with the result that thousands of cars of freight pass by New York yearly to find export at less expense from Boston."

Lieutenant Governor Horace White, in a speech delivered before the Manufacturers Association last winter, said: "One of the chief purposes of the Barge Canal was to afford competition." He said that the nation as a whole would have reaped untold benefits if the ships loaded at Duluth could have passed unimpeded to the sea; but as that cannot be, we should make the most of what we have. "It is my fear," he said, "that the railroads will own the ships on the Great Lakes, the elevators at Buffalo, the barges on the canal, and the terminals which will control the traffic at this port." This menace cannot be allowed to exist; but it cannot be neglected if the state is to receive any benefits commensurate with the expenditure for the Barge Canal.

The people of the Ohio and Mississippi valleys are clamoring for the general gov-

ernment to expend large sums of money in deepening those two rivers so that ships from the Great Lakes can pass out to sea via the Gulf of Mexico. The diversion of the grain trade from this port to Montreal also furnishes a needed warning.

Spuyten Duyvil and Inwood have been suggested for the principal terminal at this port. Certainly no one could expect to improve and foster the commerce of New York by locating the terminals there. If shippers have any cargoes for those towns or for Yonkers, Tarrytown, or the downtown sections of Manhattan, or Harlem, Brooklyn, Newtown Creek, Flushing, Staten Island, or at any other point that can be reached by water, the barges will be taken there. This would be considered local freight and distinguished from the through export business. This latter business is the business the state desires to reclaim and to foster, and a suitable terminal, with ample room, must be provided or it cannot do it.

If New York is to reap the benefits justified in the expenditure of one hundred million dollars on her improved and enlarged canal, then she must provide a suitable terminal at tidewater, where vessels can be loaded and unloaded economically and expeditiously. Such an ideal spot is found at Jamaica Bay.

Some gentlemen representing Manhattan yesterday suggested that the dry goods trade required the location of a terminal at Canal street, some others at Broad street, still another at Coentis Slip. While Mr. Palmer advocated Newtown Creek as being all important for the business of that section. We say that if the local commerce of those sections, or any section, requires the setting aside of docks or piers in order to maintain or develop the commerce over the canals, of merchandise peculiar to that locality, well and good. We have no objection, but we certainly are opposed to the selection of here and there a dock or pier for the handling of freight that in the aggregate would represent but a small percentage of the business that went over the canal for this port, if it was the means of sidetracking or preventing the Commission from selecting a suitable terminal elsewhere commensurate with the needs of the port and the requirements of the enlarged canal when utilized to its fullest capacity. The gentleman from Indiana gave the Commission good advice yesterday when he said build your terminals big because we are coming from the West, the Middle West and the Northwest, with large quantities of products for the port of New York and the railroads will be unable to furnish us with accommodations to transport them, and we shall be obliged to use the canals and hence you must furnish proper facilities for this large volume of business. This is undoubtedly true for I have heard the presidents of several of the largest railroads in the United States publicly say within the past two years, that the

time had come when the railroads could no longer keep pace with the commerce of the country and that the waterways must be developed so as to take the heavy and bulky products and relieve the railroads of that class of freight. Some of the gentlemen yesterday advocated the providing of terminals now that would answer the needs of commerce for the next few years only, and intimated that you would be doing your whole duty if you so acted. I would remind the members of the Commission if they took such a view of their responsibility in carrying out the purposes of the act that created them, that the people of the State of New York, when they ordered the enlargement of the canal by the expenditure of \$100,000,000, did not take such a view of the canal question.

Oh, no. They had in view the commerce of the remote future and not that of the present or near future. For the business of the canal had not reached a point that required an enlargement to accommodate it, and a traffic of less than 5,000,000 tons would not require its enlargement to a capacity of 20,000,000 tons. The people looked far ahead in providing the enlarged barge canal and if you do your duty you, too, will look ahead and anticipate the immense volume of business that will come to this port if proper facilities are provided, and at this time you will select a location where they can be had in abundance. Some of the speakers in a casual reference to Jamaica Bay did not really object to the location but had doubts as to its being improved in time to be available. On behalf of the Jamaica Bay Improvement Association, whose civic pride alone prompts them to suggest this location, I desire to state that we urge this selection, solely with the understanding and upon the expressed condition that the bay will be improved and ready for the terminal facilities by the time or before the work on the canal is completed. The city and National government will attend to that. Remember, the development of Jamaica Bay does not depend upon the location of the canal terminal there, but the success or failure of the improved and enlarged canal does depend absolutely upon the character of the terminals provided at this end of the state; and if they are cramped and congested because of insufficient room to properly provide the necessary appliances for the economical and expeditious handling of the freight, to that extent will the canal be a failure and the state fail to secure a return for the money expended in its rebuilding.

Our claim is that the development of Jamaica Bay as a great terminal in connection with the enlarged canal, we are advancing the best interests of the whole country in providing facilities for transporting the products of the country from the point of production to the point of consumption at the lowest possible cost. The productive areas of our country lie in the interior of the West and Northwest. The consumption of the products is largely in the populous seacoast cities and in foreign countries. The seacoast harbors must accommodate the largest ships to the end that ocean transportation may be had at the lowest possible cost. We have learned that watergoing commerce is the cheapest, and that for every ton carried by the railways at least five tons can be carried by water. The price of commodities in foreign markets fixes the prices at home. In Europe where we must compete, transportation facilities are developed to the highest point, and we suffer as a consequence by not enjoying the same facilities at home. The price of wheat is not fixed on the farms of the West, but at Liverpool, and the farmer gets the Liverpool price less the cost of transportation. To show that improved conditions do lessen the cost of freight rates, let us cite the following:

In 1870, when New York's harbor had a depth of twenty-two feet, the cost of shipping a bushel of grain to Liverpool

was 22 cents per bushel. When the depth was increased to twenty-five feet, the cost was reduced to 18 cents per bushel. With thirty-five feet of water, permitting the entrance of larger vessels, the cost of sending to the other side is about 3 cents per bushel. It is estimated that there is saved annually by the people of the United States, by reason of the deepened coast harbors, in the wheat, corn and cotton crop exported to foreign countries, \$190,000,000. On the Great Lakes, the average original depth of thirty-seven harbors was 4-10 feet. It is now 17-8-10, and many of them with the connecting channels between the lakes have a depth of twenty-one feet. There has been expended in these improvements \$70,000,000. See the effect on the freight rates from Chicago to New York. In 1870 freight on a bushel of wheat was 17 cents via lakes and canals. In 1900 it was reduced to 4-42-100 cents. The competing waterway had its effect also upon the railroad and instead of costing 46 cents a bushel it now costs by rail but 10-2-10 cents, a reduction of three-fourths of the original cost. During the season of navigation in 1907, there passed through the Sault Ste. Marie Canal to the lakes about 50,000,000 tons of freight, upon which the transportation charges amounted to \$35,000,000. On this one season's freight alone there was a saving of \$210,000,000. This is a fair return in one year for an expenditure of \$70,000,000.

A word as to the commerce at the port of New York. In 1885 New York's percentage of the total foreign tonnage movement of the United States was 44.79. In 1895, 39.08. In 1905, 38.03. While in 1908 it was less than 36 per cent. From 1875 to 1905 the gain at New York was 116.8, while Boston gained 234.08; Philadelphia, 202.6; Baltimore, 121.6; New Orleans, 286.5, and Galveston, 795.6. The total grain receipts at the Port of New York in 1898, via rail and coastwise, was 195,000,000 bushels; in 1908 the quantity received was about 105,000,000 bushels, or nearly one-half of what was received ten years ago.

A commission of painstaking engineers, appointed by Mayor McClellan pursuant to a resolution of the Board of Estimate and Apportionment for the purpose of reporting upon the general improvement and development of Jamaica Bay, not only, but also upon the condition of the water front of the City of New York, after a most exhaustive investigation of every foot of undeveloped waterfront of Greater New York, says that Jamaica Bay, and there alone, can be found the location for the proper development of the harbor facilities of the Port of New York, and I will briefly refer to their report, as it deals with the subject of the enlarged canal and its effect upon the business of this port and the need of terminal facilities. They say:

It is expected by those who have given the canal question adequate thought, that not only will the enlargement of the Erie Canal restore to New York City its former trade in grain, but that the metropolis will be benefited by it in very many ways. They point out that the discovery of iron-ore beds in the upper lake regions, taken in connection with the cheap transportation on the lakes, has led Pennsylvania to abandon its own beds and use those of the lakes, and they further express their belief that these discoveries may lead to the centering of the iron trade in the State of New York.

A report of the Committee on Canals of New York in 1899 says:

The possibilities of manufacturing development along the banks of the Niagara River, between the Falls and Buffalo, should not be overlooked in considering the transportation problem. Factories are already established in the vicinity of Niagara Falls utilizing the cheap power obtained from the Falls to an extent of 75,000 horse-power, and this will be doubled in a very few years.

The estimated capacity of the new Erie Canal has been placed at 20,000,000 tons. While we have confidence in the great benefits that will follow the canal's completion, still, rather than run risk of exaggeration, we will place the increased tonnage at 10,000,000 tons. This, then, must be added to our previous grand total of 112,454,000, making 122,454,000 tons, an increase over 1899 of 42,910,000 tons, or 53.9 per cent.

The Port of New York, therefore, must provide in 1915 accommodation for one and one-half times the amount of shipping for which it cared in 1899.

Unfortunately, however, Manhattan notwithstanding, the efficiency and skill that have characterized the development of the water front, is obliged at this time to contend not only with the ill-considered early foundation of the water-side thoroughfare that for the greater part circumscribes its territory, but has also to pay a premium for its natural advantages, since these are the means of depriving it of adequate railway connection. Because of this latter want the Port of New York has developed an almost perfect system of car floats, but with the rather dubious result of being obliged to give up thirty-one per cent. of Manhattan's Hudson River front, and five per cent. of the East River front to the various railway companies.

It is possible that Manhattan may in time secure its railway over a portion of the waterfront. This was proposed in 1896 and 1897 by the board of consulting engineers appointed by the Dock Department, but, owing to the vigorous opposition made by representative engineers of the railroads, nothing was done.

But a far worse obstacle stands in the way. Owing to the lack of proper warehouse facilities and the impossibility of bridging the street that would intervene between them and the water, if they were to locate on the waterfront, the wholesale dealers and manufacturers of Manhattan in earlier times sought establishment in widely separated parts of the city. This is really one of the reasons why New York has never been regarded by the vast majority of people as a manufacturing city.

The merchant or manufacturer, therefore, is obliged to proceed to some pier or several (they may be widely separated), secure his consignment of material, truck it over miles of city streets to the warehouse or factory, unpack it, sort it, make it up, repack and again truck it back to the wharves for shipment. This is all unnecessary and uncalled for labor, and results in additional expense not only to the manufacturer and consumer, but to the city as a whole as well, since it is obliged to make good the wear and tear of streets. In addition to this, time and money are constantly lost by the resulting congestion of traffic in the city streets, where lines of trucks the full width of the roadway and extending in some instances for two blocks from the waterside street, may be seen almost any day.

It is from a consideration of this regrettable state of affairs that the commission is led to the following conclusions:

First—That New York can do much to improve the facilities of Manhattan by the introduction of more piers of modern construction, similar to those in the Chelsea district, by installing first-class freight-handling appliances and by building a terminal railway, making it possible to directly connect steamer and car.

Second—That while it may, by putting into effect the above suggested improvements, retain and encourage for Manhattan the commercial and manufacturing industries already located there, it is in no position, by reason of its physical layout, the lack of available unimproved waterfront giving sufficient pier lengths and the excessive cost of land in direct connection with the water, to offer tempting inducements to newcomers, who, for

JAMAICA BAY IMPROVEMENT.

BIRD'S EYE VIEW OF JAMAICA BAY AS THE IMPORT AND EXPORT TIDEWATER TERMINAL OF THE ERIE CANAL.



other obvious reasons, are only too anxious to settle in this vicinity.

Why should it not then avail itself of the extensive shore line of its other boroughs and make use of the natural advantages which they have to offer? At a comparatively small outlay it could make much of this frontage fit for occupancy, thereby increasing its revenue and at the same time relieving Manhattan of much of that class of traffic which tends to congest not only its streets but its adjacent waterways.

In conclusion, gentlemen, I would say that in selecting a New York terminal for the 2,000-ton barge canal now in course of construction, due consideration should be given to the locations most favorable to the shipping and manufacturing interests, for the prime object in providing inland waterways is to lessen the cost of transporting cargoes.

The great shipments of farm and forest products from the northwest to the Atlantic seaboard should be balanced by heavy freights, consisting largely of manufactured articles that are in demand in the rural districts and cities of the West. To fully accomplish the object for which the Erie canal is being widened and deepened, an import and export tidewater terminal will be productive of a national and international benefit.

In reviewing the situation in and about the harbor of New York, physical conditions clearly point to the advantage of securing a location where ocean-going vessels can meet the cargoes of the canal at a distributing center where large warehouses, elevators and storehouses could be erected inexpensively. Transshipment from land to sea, or vice versa, requires a central point where the cargoes can be divided or portioned, as it were, through a system of grain elevators in the case of farm cereals, and with manufactured products and raw materials storehouses are indispensable.

Your attention is especially called to Jamaica Bay as affording all natural advantages:

First—It is easily accessible by the natural waterway, viz.: Hudson River, New York Bay, the Narrows and Coney Island Channel, and by means of a canal connecting Flushing Bay with Jamaica Bay at Cornell Basin as illustrated in the photographic view submitted herewith.

Second—All trunk railroads can reach the bay by a system of tunnels and bridges, such as the Pennsylvania and the New York, New Haven and Hartford railroads are now providing.

Third—The expense of constructing a connecting link from the Harlem River to Jamaica Bay would be as nothing com-

pared with the cost of improving the canal from Buffalo to Troy.

Fourth—Adequate space at the terminal for factory sites accessible to water and railroad transportation would add enormously to the value of the canal as a public utility.

MILES OF NEW HARBOR.

Jamaica Bay when fully developed will add one hundred and fifty miles of new piers to the harbor of New York.

AREA.

Jamaica Bay occupies the major portion of the southeast quarter of Greater New York, consisting in all of about 15,000 acres.

Such a site as the present and future commercial needs require is to be found at Jamaica Bay.

This commission is earnestly and cordially invited to acquaint themselves with the merits of Jamaica Bay as a tidewater terminal for the Erie Barge Canal.

JAMAICA BAY IMPROVEMENT ASSN.

N. B. KILLMER, Secretary.

396 State street, Borough of Brooklyn, New York, N. Y.

The Value of Improving Jamaica Bay Now

By Nathaniel H. Levi, President Broadway Board of Trade.

I can conceive of nothing in the line of improvements that has been under consideration by our authorities that will be so far-reaching in its influence upon the growth and development of Brooklyn, Long Island and, as a matter of fact, all the boroughs of our great city, as the improvement of Jamaica Bay and its development as a harbor, which those who have labored so long and so strenuously in its behalf hope will in due time become one of the finest harbors in the world.

The more thought that we give to this project the more impressed will we become with its vast importance.

One of the strongest features in connection therewith rests upon the fact that the location in Long Island of the terminal of the thousand-ton canal now building by the State of New York, at an expense of \$101,000,000, will depend on the speedy improvement of Jamaica Bay, for failing in this we will suffer the irreparable loss consequent to the location of the barge canal terminal in New Jersey, which, as I have frequently stated, would be almost criminal, because the people of the State of New York having paid for this canal should not, under any circumstances, confer upon any other state the tremendous advantages which the terminal of the barge canal will offer to the locality in which it will be located.

That there are influences at work to bring about the placing of this terminal in New Jersey is evidenced by the fact that Elbridge G. Snow, a member of the Chamber of Commerce, and president of the Home Insurance Company, has strong-

ly advocated the locating of the terminal of the barge canal in the Hudson River, on the New Jersey shore, near Weehawken, and it will take some concerted effort to counteract the powerful influences which are at work for the purpose of locating this important terminal on the Jersey shore, and the very strongest aid we can give our opponents is to neglect to put Jamaica Bay in shape so as to afford the proper facilities for the barge canal, for in which event there would be no other alternative but to locate it in New Jersey. But we hope that our authorities will join the civic bodies in their efforts and aid with all the means at their command to hasten the development of Jamaica Bay, so as to have it in proper condition to have the terminal located therein when the barge canal is completed, in 1914. Those who have made a close study of the situation have viewed with more or less alarm the inroads which the smaller ports have been making upon the commerce of New York, threatening, as it were, the commercial supremacy of our great city, because of deficient docking facilities and our lack of open piers. But with the development of Jamaica Bay as a harbor in progress, these inroads will cease, and thus assure to our city a commercial supremacy which we hope will not be endangered for centuries to come.

Dock Commissioner Calvin Tomkins, at a hearing held before him on February 10, stated that there was great and urgent necessity for better dockage facilities along the water front, both in Brooklyn and Manhattan, and Mr. Tomkins also called attention to the fact that there was a great lack of open piers, all of which points to the conclusion that unless this deplorable situation is met by the speedy development of Jamaica Bay as a harbor, the inroads upon the commerce of New

York spoken of previously will continue and its commercial supremacy will be placed in the balance.

In view of the vast importance of this project our congressmen must be urged to keep up their good work in Congress continually in order that there be no unnecessary delay in the granting of the appropriations for the carrying on of this project.

Our authorities are alive to its great significance and will, we hope, do their share and it is up to Congress to do its part, and Congressmen Law and his confreres from Brooklyn, Manhattan, Queens and Richmond can no doubt be counted upon to keep the pot boiling.

When the barge canal is completed, which, as stated before, will be in about four years hence, it is presumed that 20,000 to 25,000 tons of freight will be brought to New York and it is extremely important that ample provisions be made to care for this increased traffic, and this can be best accomplished by the speedy development of Jamaica Bay.

Nature, it seems, has been very generous to us in placing within easy reach a place which can readily be made one of the most perfectly sheltered harbors in the world, and if properly constructed it could be intersected in such a manner with deep water channels that all points of importance in its vicinity could readily be reached by the largest freight and passenger steamers afloat.

I feel that the possibilities which the improvement of Jamaica Bay holds out and its extremely far-reaching importance to the city and State of New York, inasmuch as it will bring about when completed a largely increased business and the development of miles of marsh lands and worthless places, amply justify the expenditure of the many millions of dollars necessary to complete this most important work.

The Building of Jamaica Bay Harbor

By Frederick Boyd Stevenson.

With an appropriation of \$1,000,000 by the City of New York for preliminary dredging, backed by \$7,430,050 from the United States Government for the dredging of Rockaway Inlet, the magnificent inner harbor of Jamaica Bay—a harbor that will rival all other great harbors of the world—is at last assured. The dream has become a reality. As one calmly looks over the facts and the figures the magnitude of this wonderful project takes possession of him. Here, briefly, is the extent of the gigantic enterprise.

An ample and a secure harbor for mighty ocean vessels crossing the Atlantic; terminals for the ships and the barges of the huge barge canal under construction by the State of New York at a proposed cost of \$101,000,000, affording direct marine communication with the chain of Great Lakes; wharfing capacity for the vessels that will be engaged in the coastwise trade upon the completion of the Panama Canal; a solution for all time to come to the dockage problem of the City of New York, which, under present conditions, is driving the commerce of the merchant marine to other ports; a practical and natural terminal for all railway lines of the United States, affording an immediate interchange of freight shipments by rail and by water; the reclamation of useless land, valued at \$12,000,000 to \$15,000,000, the title to which will be vested in the city, and which will be available for innumerable sites for warehouses, grain elevators, factories, industrial plants and homes for workmen.

On the completion of the project, the ultimate cost of which will be from \$70,000,000 to \$100,000,000, the City of New York will be provided with a supplementary harbor of magnificent proportions, the entrance to which will be through a 1,500-foot channel to be dredged through Rockaway Inlet, and which will be equipped with one hundred and fifty miles of piers and wharves long enough to accommodate the biggest ocean steamers. Here, a few miles northeast of Sandy Hook, is the natural gateway of the Atlantic. It is sheltered from the open ocean by the long protecting arm of Rockaway Beach. The bay has a water surface of 16,170 acres, twenty-five and a half square miles, surrounded by low marshes on three sides which aggregate 8,500 acres. In addition there are 4,200 acres of marsh lands apart from the main body, so that Jamaica Bay, with its adjacent marsh lands, covers a territory of 28,970 acres, equivalent to forty-five and a half square miles, which is double the area of the Borough of Manhattan. The shore line of the bay approximates twenty-five miles and, with the creeks and waterways filled in and the chief channels cut, there will be an available docking capacity to provide for all time to come. Three islands which can be made avail-

able, and the shores of the mainland will afford room for these wharves and piers. Barren Island, which is the northern shore of Rockaway Inlet, is backed by a score of islands, and Riches Point Meadows, capable of easy reclamation and consolidation. These could form what would be known as West Island. The central archipelago could be merged into two companion islands to be known as North and South Islands. Between them, from east to west, would run the ship canal, five miles long and lined on both sides with piers. This would be the main channel, 1,500 feet wide and thirty feet deep.

Thus, if this harbor had been laid out by man, with the needs of the shipping interests of the United States and the metropolis in view, it could not have been planned with greater advantage to both than Nature has provided. The bay is bounded on the south by long, low sand dunes, known as Rockaway Beach, on the easterly and central parts and on the westerly part as Rockaway Point; on the north by the meadows lying in the old town of Jamaica in Queens County, and by the Twenty-sixth and Thirty-second wards in Kings County; on the west by marsh land. To the north of the main entrance to the harbor is Barren Island. From the City Hall, Manhattan, it is eight miles to Gerritsen Creek, to Bergen Beach and to Canarsie Landing. From the same point it is ten miles to Barren Island and eleven miles from Rockaway Point at the Inlet. Rockaway Point is six and five-eighths sea miles from Sandy Hook. These points form the pass through which all the ebb waters of the upper and lower bays of New York Harbor, including Jamaica Bay, the Hudson River and much of the East River, are obliged to go on their way to sea.

We have seen the importance of this improvement in its relation to the waterways leading inland and to Europe, and the importance is greatly increased by the proposed railway connections that form part of the general plan. The Long Island Railway already traverses the islands known as North and South Islands. On the Long Island shore would be four long rectangular basins where the Pennsylvania and other railroads could be provided with terminals from which they could run trains through the East River and North River tubes to New Jersey and on across the continent. The land on which these terminals could be built belongs to the city by the terms of special grant of the state. Along the outer margins of the proposed West, North and South Islands and the mainland, with which they could connect by trestle, a terminal railroad would link the numerous piers one with another, and enable the Long Island, the Pennsylvania, the New York, New Haven and Hartford, and the New York Central systems, by means of tunnels under the East River, to

transfer and receive cargoes at the water's edge. The Connecting Railroad, now building, which runs from Bay Ridge on New York Bay, through Brooklyn and the Borough of Queens, crossing the East River to the Bronx, and forming a tie-line between all these railroads, taps Jamaica Bay where it crosses Fresh Creek, only a short distance from the bay itself. The Connecting Railroad is to be a great trunk line. It will permit the entrance of all railroads into the city and furnish them a means of entering this extensive waterfront. In the proposed plan it is intended that merchandise may be unloaded upon almost any one of the piers to be constructed, and from there placed directly into a car which will take it to its destination in any part of the United States. The Pennsylvania Railroad is planning terminals along the waterfront so as to touch at every dock when completed. With all these shipping facilities in view, it is estimated that the improvement of Jamaica Bay will effect a reduction of \$1 a ton in freight rates to that section, because wharfage accommodations with railroad connections will be secured, thus overcoming the serious objections to the present terminals.

Aside from providing terminal facilities for the great railway systems of the country Jamaica Bay will, in all likelihood, be the tidewater terminal of the 2,000-ton Barge Canal of New York State. Barges from the great canal could leave the Hudson River at Spuyten Duyvil, going through the proposed Harlem Ship Canal, Harlem River, Bronx Kills, and East River to Flushing Bay. Thence, it has been suggested, that an eight-mile canal might be cut through to Jamaica Bay Harbor, following Flushing Creek for three miles, and entering Jamaica Bay at Cornell's basin. Thus a direct inside route would be afforded with the Barge Canal and the Great Lakes, and this communication will be extended to Europe both in freight and passenger service. All the important ocean passenger liners will dock in Jamaica Bay Harbor, and when the project has reached completion it will be possible to step from a transatlantic steamship directly into a transcontinental railway train, so that a tourist can go from San Francisco to Liverpool entirely under cover.

There are other features, however, that are being considered, among them the waterway of Coney Island ship canal, sometimes called Gilman's Channel, and Gravesend Bay connecting with Jamaica Bay. This channel will provide another safe inside route from New York Bay through Coney Island Ship Canal to Sheepshead Bay and on the Jamaica Bay, thus avoiding an outside ocean route. Great South Bay could also be connected by a canal with Jamaica Bay along the south shore of Long Island by converging the waterway into canals that would provide a waterway for moderate-sized

JAMAICA BAY IMPROVEMENT.

rafts from Jamaica Bay to Peconic Bay during all the stages of tide.

One of the most important features of the proposed undertaking—from a local viewpoint, at least—is the dockage question. The growth of the City of New York has been so rapid that it has outgrown the facilities of its water fronts. Dock rentals have reached an almost prohibitive figure. From 1898 to 1907 the increase in wharfage accommodations, both private and public, was only 22 per cent., and it was admitted by the Dock Department that this was due to the want of accommodations, steamships being driven to other ports. This was only the beginning of the trouble, for since those years the demands for dockage have greatly increased.

In the meantime the increase of foreign commerce at the port of New York, from 1898 to 1907, was more than 75 per cent., despite the inadequate wharfage facilities. In round figures this meant that the increase was from \$847,000,000 to \$1,482,000,000. On the other hand, from 1880 to 1898 there was a decrease of more than \$4,000,000. Therefore, it will be seen that the foreign commerce of the port is gaining in an astonishing ratio and will soon be far beyond the limits of the present wharfage facilities. There can be but one result to this situation: Unless a harbor with adequate dockage is ready, these vast shipping interests will seek other ports. Already Canada is actively engaged in the race to obtain supremacy over Montreal as the chief Atlantic port and is spending millions in its betterment, while private capital in that country is planning a Georgian Bay canal, and the government is projecting a trans-continental railway, with the lowest gradient of any that crosses the Rocky Mountain range, which will provide the cheapest methods of transportation between England and the Orient. Aside from possible Canadian competition, however, there is the danger of the neighboring cities of New Jersey taking advantage of the situation. There have been also ambitious plans on foot for great harbors at Boston and Montauk Point, but now that the Jamaica Bay project is safely on its way, these plans will be abandoned.

The first work on this great undertaking will be started this summer by Dock Commissioner Tompkins, and will consist of the erection of a bulkhead on Fresh Creek on the north shore of the bay, and the dredging of a 400-foot entrance to the creek connecting with the government's 500-foot channel from the inner corner of Barren Island seaward. The creek itself will then be dredged to a width of 400 feet, and when completed will be 7,000 feet long. On the made ground of the east shore a tract of land will be reserved for factory sites, back of which will run the Pennsylvania Railway. Shipping yards will occupy the space nearest the water. On the opposite shore will run the Canarsie branch of the Brooklyn Rapid Transit Railway. Continuations of Denton, Skidmore, Seaview and other streets will terminate there.

Now that this huge project is on the verge of accomplishment, the question naturally asked is: "Who started the movement?" A comparative small body of men possessed of a dynamic personal force have been the originators and the

promoters of this proposition, which will revolutionize the shipping and commercial interests of the city, the state and the nation. The movement is the work of the Jamaica Bay Improvement Association, a civic body which is the creation of the Allied Boards of Trade, which decided that the subject was so big and so important that it ought to be pressed by an organization having the furtherance of this plan for its sole work. The president of this association is Henry A. Meyer of Flatbush, who may be considered the father of the entire plan. It was he who first put into practical use the details of the project and whose force brought to a successful termination the work done by his organization in the last four years. The other members of the association, all of whom have been active in the work, and to whom the public is under deep obligation, are: Elwin S. Piper, first vice president; John R. Corbin, second vice president; George W. Wilson, third vice president; N. B. Killmer, secretary; James Russell Curley, treasurer. The advisory committee consists of Abraham Abraham, John Adikes, William Berri, David A. Boody, George W. Brush, M.D.; Bird S. Coler, Julian D. Fairchild, Edward M. Grout, Lawrence Gresser, McDougall Hawkes, F. J. H. Kracke, William McCarroll, Herman A. Metz, St. Clair McKelway, Andrew McLean, Charles R. Norman, Thomas P. Peters, L. H. Pounds, George H. Roberts, I. S. Remson, Samuel Rowland, Calvin Tompkins, Andrew F. Wilson, W. F. Wyckoff. Another man who should be especially mentioned is Congressman Charles B. Law, who represents the Eastern District of Brooklyn and who worked for the project early and late in Washington. Then we must not forget the untiring efforts of the Jamaica Bay Improvement Commission, composed of Philip P. Farley, president; William G. Ford, secretary, and John J. McLaughlin, who from first to last, have been loyal to the plan.

In the early stages of the agitation of the movement, Henry A. Meyer and John R. Corbin induced a party, composed of city officials and congressmen, to visit Jamaica Bay and look over the situation. Now Mr. Meyer is a pretty good talker, and he was so well versed on his subject that he won over many of those who were present on that occasion. He interviewed Congressman (now Senator) Burton, who was then chairman of the Rivers and Harbors Committee and is now chairman of the National Waterways Commission, and convinced him that the project for Jamaica Bay was logical and feasible. Since that time Senator Burton has been the fast friend of the plan. Then a revenue cutter went there four years ago, and since then things have begun to move. The Jamaica Bay Improvement Association was formed, and, with Mr. Meyer at its head, remarkable work was done.

Mr. Meyer's study into this question extends back a number of years. He has traveled extensively in Europe and investigated the great foreign harbors.

"In the City of Hamburg," said he the other day in conversation with the writer, "eighty million dollars have been expended by the city in improving the harbor. The city refuses the aid of the government in maintaining and improving this

wonderful harbor. There are 600 electric derricks on the docks. In other parts of Europe the harbors are highly developed and the governments are keenly alive to the need of caring for the merchant marine. The Barge Canal of New York State will be finished in 1914 to the Hudson River, which the United States, by an appropriation of \$1,500,000, will deepen all the way, but no provision was made for terminals which are as necessary as the canal itself. The dockage of New York is so inadequate that it can hardly be taken into account at all. New York City at one time was the center of large grain interests, but to-day the city has only one grain elevator. By the provisions of the legislative act the state cedes to the city from thirteen to sixteen thousand acres of land that now lie waste and profitless, but which can be easily reclaimed and converted into 223,000 lots which the city can sell for dwelling purposes, or factory sites or utilize for public parks. The money realized from the sale of this land would be more than sufficient to pay for the cost of constructing the waterway. The land ceded to the city constitutes about one-half of the reclaimable land in this section."

In this connection it should be mentioned that the charge has been made that this movement is a real estate scheme, by means of which speculators expect to make millions. Men whose motives cannot be questioned deny this. There will be a certain amount of speculation attending the promotion of any great project. In the buildings of a railroad, for instance, there are always men who will make money out of land deals. When the subway was constructed in Manhattan fortunes were made in options in Washington Heights, but nobody has suggested that on this account the subway ought not to have been built. Outside of Jamaica, which has a population of nearly 50,000, the sections which will be most directly interested are the Twenty-sixth and Thirty-second wards in Brooklyn. The center of population in the Twenty-sixth Ward, which is estimated at 100,000 and is constantly growing at the rate of 9 per cent. yearly, is only two miles from the north shore of Jamaica Bay and one mile from the head of Fresh Creek at the point where the Long Island Railway crosses the waterway. In the Thirty-second Ward, which is known as Flatlands, and forming part of the boundary of Jamaica Bay, Avenue N is only six city blocks from the head of Mill Creek along the main street, which is Flatbush avenue. Flatlands has a population of about 18,000, increasing at the rate of 12 per cent. annually. Flatbush, nearby, has a population of more than 50,000. These sections will doubtless be benefited by the improvement. Next to them the Twenty-ninth and Twenty-fourth wards will gain. But these four wards have gained remarkably in the last three years without the building of the Jamaica waterway, for during the years 1907, 1908 and 1909, 10,348 buildings were erected there at a cost of \$67,500,000.

Mr. Meyer's attention was called to this talk concerning the speculators.

"It is true," said he, "that speculators are trying to make money out of the movement. That is all the more reason why the city should be prompt to condemn the remainder of the land not ceded to it by the state. It may result in some of the holders making money, but it can be secured much cheaper now than after the improvement is under way. There is much of this land now that the speculators have not secured, and hence the necessity of immediate action on the part of the city. This land will become very valuable and the city should take advantage of the situation at once."

One Thousand Ton Barge Terminal

By Elbridge G. Snow, of the New York Chamber of Commerce.

It seems to me that of the proposed terminals for the new State Barge Canal, that of all the locations which have been suggested, Jamaica Bay is the least practical and desirable. It is the farthest removed from the points where merchandise going by this route would be destined and would require the towing of the barges through the entire harbor, through the Narrows and the Lower Bay, and along the ocean front of Coney Island to Rockaway Inlet. The handling of large Hudson River tows in the Hudson River below the upper railroad terminals has always been a matter of great inconvenience and considerable danger to harbor traffic. These slow-moving tows have in the past been broken up after passing Grant's Tomb, and boats destined for points along the river front, the various railroad terminals, the building material market and the lumber distribution points, are taken from these tows by tugboats as they come down the lower part of the Hudson River, and after that pass through the harbor. This operation necessarily calls for a slowing up of the tow, and this is often, I may say, customarily, done in such a manner as to obstruct the ferries leading from New York City to Jersey points, and interfere with the navigation of vessels bound up and down the North River and through the bay and up the East River. It is probable that this practice will very largely continue in the future and with the increased congestion of our harbor, due to enlargement of the local trade and a larger number of steam and towed vessels, will tend to greatly aggravate conditions which are at present as serious as ought to be permitted.

The large tows bound north and south between New York City and Perth and South Amboy, are, even at the present time, much complained of as interfering with navigation all the way from the Communipaw Docks to Robin's Reef. The traffic in and out of the East River is of

large volume and the conditions of navigation are not by any means easy under present conditions. Tows bound up and down the bay between the mouth of the Kill von Kull and the East and North rivers frequently find weather conditions so hazardous as to compel them to tie up at some point before entering that part of the harbor indicated. Every year for many years past one or more serious disasters has befallen tows navigating that part of the Upper Bay, and the courts have been resorted to in endless litigation growing out of the handling of large tows in these localities. Incoming and outgoing transatlantic and coastwise steamers find their navigation seriously hampered by vessels engaged in the trade, and frequent mishaps have arisen therefrom.

If the barge terminal should be located in Jamaica Bay, this would add another, and, it is to be presumed, very large factor to the situation, with the steamship navigators already complaining of the difficulties which they encounter between large tows in the harbor and the dumping scow tows bound for the dumping grounds off Sandy Hook, it cannot be questioned that the addition of tows necessarily trading between a terminal in Jamaica Bay and points on the state canal would add another and very serious disadvantage to our harbor as a port.

Besides this, it is a fact that even in the summer months a slow moving tow going out through the Narrows and after leaving Gravesend Bay, would find itself at times in serious difficulty before it could reach Rockaway Inlet. Even with the comparatively few vessels now making their routes between the Lower Bay and Rockaway Inlet, there have been numerous and disastrous accidents, growing out of sudden storms arising before a safe refuge could be made. Rockaway Inlet itself has an ever-shifting channel, and the cost of making of such width and keeping it in such condition as

to make it at all available as a terminal for tows and barges would be enormous. Besides this, it is to be expected that barges coming from points in the interior and using the state canal will have cargoes bound to various points in Manhattan, Brooklyn and points on Long Island Sound and in New Jersey. It is anticipated that much of the merchandise that would come in these barges will be for trans-shipment on ocean-going or coastwise vessels, and a terminal so removed as the Jamaica Bay suggestion would seem to be outside of all reasonable consideration.

With the erection of the New York and New Jersey Bridge, the danger and inconvenience of the situation would be greatly enhanced, and there are undoubtedly far more available situations above the point where the new bridge is projected than any that could be suggested south of such a point.

It is to be hoped that in locating the new terminal very careful consideration shall be given to future developments of the port, and that no conclusion favoring any single interest may enter into its determination. The location of the terminal in Jamaica Bay would undoubtedly be of enormous advantage to the one railroad operating in Long Island, but that does not argue that such a location would be for the best interests of the commerce of this port.

Besides all the disadvantages and inconveniences of transporting tows of barges through the river and harbor, it must not be forgotten that time is a most important factor, and that this class of tows must necessarily move slowly and at such a distance from the center, the loss of time going to and from the terminal would be very considerable, besides the additional expense of that towage and the further fact that its location would be such that at frequent intervals the tows would have to await favorable weather conditions before being able to leave or proceed to such a terminal.

The Influence of the Jamaica Bay Improvement on Real Estate.

By Elwin S. Piper.

The ultimate and relatively early transformation of Jamaica Bay from an enormous lagoon to one of the world's greatest harbors is no longer a dream, but a foregone conclusion. It is just as certain as death and taxes. There is no other way to adequately accommodate the rapidly increasing commerce of this port, that has already outgrown and overflowed the area of our present harbor and its facilities. But if there were a dozen other ways, still would Jamaica Bay present the ideal way. A natural basin right on the ocean front, with an area of twenty-five square miles perfectly landlocked and protected from ocean storms, except at its single half-mile entrance; that basin with a bottom of sand, gravel and clay—no rock whatever—and 16,000 acres of salt meadow shores to be bulkheaded and converted into highlands, with the materials dredged at the lowest possible cost, and with innumerable islands, large and small, to be consolidated and built up in the same advantageous manner. Such part of the shores and islands not required for its own purposes or control would largely reimburse the city through their

sale for the initial cost of the development. Through the co-operation of the city, state and Federal Government, Jamaica Bay will be made the depot and clearing house for all classes of coastwise and foreign commerce. When fully developed, not only will it accommodate the greatest passenger steamers that plow the sea, but the tramp vessels will find ample berthing there as well. The great export and import terminal of the 2,000-ton Barge Canal will also be there established, entrance to Jamaica Bay being gained for this class of transportation by a canal extending across the Island from Flushing Bay. Business will beget business. Adequate freight and passenger terminals will be established by all the leading railway lines. Elevators and storage warehouses will be built in almost endless numbers. Extensive manufacturing establishments will seek these shores and islands, drawn thither by the greatest of all magnets—cheap transportation of raw materials and manufactured products and superior accessibility to all the markets of the world. The multitude of activities that will center in and

cluster about Jamaica Bay will give employment to ever increasing thousands of men, who, together with their families, must be suitably housed within a convenient distance of their daily employment. The housing of these scores of thousands cannot fail to build up many hundreds of vacant acres in Brooklyn and Queens in the vicinity of the bay, which, under ordinary conditions, the natural growth and trend of population would leave to the last to come under development. The deepening of the bay and the elimination of its marshy shores and islands should make the entire section exceptionally desirable for residential purposes. While Brooklyn and Queens will enjoy these great incidental benefits that will grow out of the creation of the immense harbor, the larger and more important and permanent benefits will materially affect the commerce and prosperity of the entire city and the state as well. In fact, there will be no maritime interest throughout the entire country or world that has relations with this port that will not be more or less benefited or con-venieniced by this greatest improvement New York City has ever had.

Chapter 568, Laws of New York.

AN ACT to grant to the City of New York certain lands under water in Jamaica Bay and vicinity. Became a law May 29, 1909, with the approval of the Governor. Passed by a two-thirds vote. Accepted by the city.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. To the end that The City of New York may co-operate with the federal government in the creation of a new harbor in and about Jamaica Bay, including the making of channels, basins, slips and other necessary adjuncts, through the excavation of the soil or

lands under water, and otherwise, intended for the advancement of the commercial interests of the city, state and nation, there is hereby granted for the purpose specified in this act, to the City of New York such right, title and interest as the State of New York may have in and to the land under water in Jamaica Bay and Rockaway inlet and the tributaries thereto which lie to the northward of latitude forty degrees thirty-three minutes north, and to the eastward of longitude seventy-three degrees fifty-six minutes west, as now interpreted, excluding, however, all lands under water included within the bound-

ary of Nassau County. This grant shall become operative upon the United States Government making its first appropriation for the creation of the new harbor mentioned in this act, or upon the City of New York appropriating and setting aside a sum not less than one million dollars for the same purpose.

Sec. 2. The grant shall not affect such land as may hereafter be granted by the commissioners of the land office under any application made prior to May twentieth, nineteen hundred and nine, but if any such application be denied, the land covered thereby shall pass to the City of New York under the conditions of this act.

Extracts From Majority Report, Jamaica Bay Commission

While it is a pleasing duty to record the government engineers' recognition of the necessity of the improvement of Jamaica Bay, it is likewise a duty to discuss, briefly at any rate, the methods to be employed by them in making and maintaining the most important part of the whole improvement, namely, the entrance through Rockaway Inlet; for it must not be forgotten that the city, without having any part in the preparation of the plans for the execution of this part of the work, is nevertheless to be a vitally and financially interested party in the entire transaction. The city's money, in the event of the improvement's taking place, would be spent in the acquisition of lands, in the building of bulkheads and upon other improvements in the interior of the bay, all of which, it is true, offer in themselves few obstacles to complete success; but the interior improvements and the making of the entrance channel are so interdependent that it can justly be said that whatever money is spent by the City of New York in Jamaica Bay will be profitable or otherwise in precise ratio to the government's success in dredging and holding a channel through the Inlet.

It is recognized by all engineers that there is no problem to the solution of which more uncertainty attaches than to the building of harbors and in particular of harbor entrances.

What, then, should the attitude of the city be toward the improvement? Two years ago we said that until the final adjustment of this matter of the entrance, the city should spend no money whatsoever in the development of Jamaica Bay for industrial purposes. Strictly interpreted, this would mean that nothing should be done by the city until the entrance channel had been made and until such time had elapsed as would demonstrate either its permanency or its maintenance at reasonable cost. Viewing all the circumstances, however, and having in mind particularly the fact that this is possibly the first time the Federal engineers have consented to the expenditure of government moneys upon the improvement of a harbor where the commerce is largely prospective, and also the fact that the recommendations were made condition upon the city's bearing its share of the expense and assuming an equal part of the responsibility, it would seem better to make a broader and more liberal interpretation of the recommendation to which we have made reference. If the City of New York engages in this work, in conjunction with the United States Government, it is but natural that the latter should expect to have the former expend its money at the same time and not after the entrance is made and gives some assurance of moderate

stability. This position of the government is perhaps the only logical one that it could take. It recognizes the project as one offering magnificent promises for the future, but it is also cognizant of the risk and uncertainty involved. Realizing this, it is willing to proceed, but upon the one condition that the city become a party to the enterprise.

It is well known to all that a dredged channel in this location will not be permanent, and that it will have to be constantly maintained. It appears to us furthermore that such a channel does not offer sufficient security to the manufacturer to induce him to locate upon the shores of Jamaica Bay. It will be noted that the government's initial channel is to be 500 feet wide and 18 feet deep. This is to be maintained at a yearly estimated cost of something less than \$55,600. It cannot, of course, be stated for how many years this appropriation for maintenance will be continued; for certainly no one is in a position to absolutely forecast the progressive development of the bay front.

Another feature of the government's plan to which we would call attention is that which contemplates the widening of the channel to 1,500 feet and the deepening of the same to 30 feet before any protective works, such as jetties or groines are built. Naturally, this increase in the size of the channel will not be attempted until the industries clustered about the bay demand the increase, and yet we fail to see how such industries will increase or will find encouragement until some assurance of stability be shown, and this will come apparently only when protective works are built. We regret that the plan did not call for the construction of the jetty prior to or immediately after the dredging of the 500-foot channel.

We desire also to express here our opinion that it would have been better had the direction of the channel been planned to take a more southerly direction than the one proposed in Colonel Knight's report. In our former report we took the liberty of expressing ourselves fully upon this matter, and gave our reasons for believing that the proper direction for the construction of a jetty and for the location of an entrance channel should be in a southerly direction, and we also expressed the opinion that a jetty placed in a southwesterly direction or practically in the prolongation of Rockaway Beach itself would be useless as an agent in creating a self-sustaining channel.

We have no intention in stating these facts to appear too critical of the federal engineers' recommendations, but desire merely to place your board in possession of the facts as we see them in order that you may be in a position to follow the reasoning or arguments contained in this report, and so be able to judge of the value of the conclusions reached and the recommendations made. Nor is it our desire or wish that the city reject the government's very generous and liberal offer, for we believe that the United States engineers see the possibilities of Jamaica Bay as we see them; that they

desire to see this magnificent body of water made a useful adjunct of New York Harbor. We are free to say that we agree with them that this improvement should take place, but that it should be done with extreme caution, and that whatever initial expenditures are made upon the part of the city should be only such as are sufficient to demonstrate the stability of the entrance at Rockaway Inlet.

THE PORT OF NEW YORK.

It may be well to emphasize two facts of importance which are apt to be overlooked by many people in discussing problems connected with the development of the port of New York. The first is that, when we refer to the port we do not mean the City of New York, but rather that entire district, the imports and exports of which are subject to the inspection and regulation of the New York Custom House. This customs district embraces not only the City of New York, but likewise all the Hudson River shore of New Jersey, the Bayonne peninsula, the shores of the Kill von Kull, and Arthur Kill, and takes in such important industrial places as Jersey City, Bayonne and Hoboken. The second point to be remembered is that foreign tonnage as referred to in the statistics of any port refers to vessel or net registered tonnage and not to cargo tonnage. These facts are extremely important in any consideration of New York harbor improvements, since the first demonstrates clearly that, no matter how much we may be actuated by local pride, we could not, if we would, deal with this industrial district without regarding as one the various communities mentioned, while the second shows just as clearly that in providing a sufficient amount of wharfage to care for commerce, it is necessary to distinguish between net registered tonnage and cargo or freight tonnage. For the purpose of making comparisons between New York and other ports, there is, of course, no harm in using net registered tonnage, since it is in this form that all the figures of government statistics are given.

If the reason given for New York City's location is a good one, it follows that the minor cities, towns and villages, which are included within its industrial district, all play some part in maintaining the commercial supremacy of the port. New York is the central market for the products of these communities. With this in mind it is interesting to note, in census bulletin No. 101, that the total population of the New York industrial district amounted in 1905 to 5,294,682, and the value of its total product to \$2,144,448,000.

While the figures given are, as we have said, interesting, they would not aid us in the preparation of plans for harbor improvement, or any other kind of public improvement, unless accompanied by figures indicating the rate of growth. Below follow tables 1, 2, 3 and 4, which are compiled from the United States Census Reports, from the State Census





JAMAICA BAY AND

ROCKAWAY INLET, N.Y.

WHICH ACCOMPANIED U.S. REPORT SUBMITTED
JANUARY 30, 1909 IN COMPLIANCE WITH
RIVER AND HARBOR ACT OF MARCH 2, 1907

and from the United States Statistical Abstract, and which show the growth in population, in manufacture, and in foreign tonnage:

TABLE 1.

Showing Growth of Population in New York City Since 1800.

Year.	Population.	Inc.	Annual rate of inc.
1800	79,216
1810	119,734	40,518	5.11
1820	152,056	32,322	2.70
1830	242,278	90,222	5.93
1840	391,114	148,836	6.14
1850	696,115	305,001	7.80
1860	1,174,779	478,664	6.88
1870	1,478,103	303,324	2.58
1880	1,911,698	433,595	2.93
1890	2,507,414	595,716	3.12
1900	3,437,202	929,788	3.71
1905	4,018,781	576,579	3.35
1910	4,600,000 (estimated)		

TABLE 2.

Comparative Statement—Statistics of Manufactures.

	Value of products.	P.C.
City.	1905.	1900. inc.
United States ..	\$14,802,147,087	\$11,411,121,122 29.7
New York	1,526,523,006	1,172,870,261 30.2
Manhattan & Bronx	1,043,251,923	810,807,976 28.7
Brooklyn	373,462,930	313,617,489 19.1
Queens	92,941,158	35,427,561 162.3
Richmond	16,866,995	13,017,236 29.6
Boston, Mass....	184,351,163	162,764,523 13.3
Chicago, Ill. ...	955,036,277	797,879,141 19.7
St. Louis, Mo..	267,307,038	193,732,738 38.0
New Orleans, La.	84,604,006	57,446,116 47.3
Philadelphia, Pa.	591,388,078	519,981,812 13.7
Baltimore, Md..	151,546,580	135,107,626 12.2
Norfolk, Va. ..	5,900,129	4,691,779 25.8
San Fran'co, Cal.	137,788,233	107,023,567 28.7
Charleston, S.C.	6,007,094	5,713,315 5.1
Savannah, Ga..	6,340,004	3,750,000 69.1
Mobile, Ala.	4,942,331	3,485,669 41.8
Galveston, Tex..	2,996,654	3,675,323 *45.7

*Decrease.

TABLE 3.

Manufactures and Population of New York by Boroughs.

Municipality.	Census.....	Number of establishments.....	Value of products, including custom work and re-pairing.....	Population.....
Industrial district	1905	25,257	\$2,144,488,093	5,294,682
Total	1900	23,262	1,614,267,347	4,539,390
Per cent. of increase	8.6	32.8	16.6	
New York City.....	1905	20,839	1,526,523,006	4,013,781
.....	1900	19,243	1,172,870,261	3,437,202
Per cent. of increase	8.3	30.2	16.8	
Brooklyn Bor'h.....	1905	4,182	373,462,930	1,358,686
.....	1900	4,301	313,617,489	1,166,582
Per cent. of increase	*2.8	19.1	16.5	
Manhattan and Bronx Bor'hs.....	1905	15,975	1,043,251,923	2,384,010
.....	1900	14,362	810,807,976	2,050,600
Per cent. of increase	11.2	28.7	16.3	
Queens Bor'h.....	1905	513	92,941,158	198,240
.....	1900	395	35,427,561	152,999
Per cent. of increase	29.9	162.3	29.6	
Richmond B'h.....	1905	169	16,866,995	72,845
.....	1900	185	13,017,236	67,021
Per cent. of increase	*2.6	29.6	8.7	

*Decrease.

TABLE 4.

Showing Tonnage of Vessels Entered and Cleared at New York, 1885-1908.

Year end June 30.	Entered.	Cleared.	Total.	Per cent. increase or dec.
1885	5,659,733	5,440,724	11,100,457
1886	5,558,938	5,388,335	10,947,273	-1.38
1887	6,087,110	5,779,691	11,866,801	+8.40
1888	5,683,371	5,547,442	11,230,813	-5.36
1889	5,596,821	5,454,415	11,051,236	-1.60
1890	6,258,222	6,025,518	12,283,740	+11.15
1891	6,452,877	6,043,784	12,501,661	+1.77
1892	7,304,015	7,140,393	14,444,408	+15.54
1893	7,015,030	6,639,433	13,654,463	-5.47
1894	7,121,527	6,964,927	14,086,454	+3.16
1895	6,688,595	6,499,490	13,188,085	-6.38
1896	6,911,782	6,552,614	13,464,396	+2.10
1897	7,267,480	6,943,835	14,211,315	+5.55
1898	7,771,412	7,576,630	15,348,042	+8.00
1899	7,707,477	7,496,279	15,203,756	-0.94
1900	8,176,761	7,843,529	16,020,290	+5.37
1901	8,679,273	8,118,427	16,797,700	+4.85
1902	8,982,767	8,415,291	17,398,058	+3.57
1903	9,053,096	8,847,072	17,900,168	+2.89
1904	9,285,524	8,700,590	17,986,114	+0.20
1905	9,680,853	9,311,527	18,942,380	+5.61
1906	10,476,993	9,913,960	20,390,953	+7.64
1907	11,383,345	10,472,601	21,855,946	+7.19
1908	12,154,780	11,939,964	24,094,744	+10.22
Total increase in tonnage, 1885-1908.....			12,994,287	
Per cent. increase in 23 years.....			117.1	
Yearly rate of increase, 23 years.....			5.1	

The increase in population from 1900 to 1905 in the industrial district in New York City as a whole, in Manhattan and the Bronx, and in Brooklyn, seemed to be about 3 1-3 per cent.; Queens Borough shows close to 6 per cent., while in Richmond the gain was less than 2 per cent. In manufacture (value of products) the increase for the entire industrial district, and for New York City, as a whole, are quite the same, the former being at the rate of 6½ per cent. and the latter 6 per cent. Brooklyn has not kept pace with Manhattan, the increase amounting to 3.8 per cent. or about parallel with its growth in population. Queens Borough shows a substantial increase, being at the great rate of 32½ per cent. The value of its present production is remarkable, amounting to \$92,941,158, or to about 25 per cent. of Brooklyn's total, although its population amounts to but 14½ per cent. If we remember that most of the industrial manufacturing establishments in the Borough of Queens are located along the shores of Newtown Creek or in Long Island City, the population of which in 1905 was only 55,486, a clearer idea of its commercial enterprise can be secured, for it is very probable that while the ratio of the value of the manufactured products of this part of Queens Borough alone to that of Brooklyn remains the same, or 25 per cent.; its population to that of Brooklyn is but 4 per cent. The reason for all of this we shall not stop to explain here, but will do so when treating of Jamaica Bay as a manufacturing center. We have already called attention to the great growth in foreign tonnage and need not refer to it again, except to say that the gain for the years 1905 to 1908 amounted to 27.2 per cent., or at the rate of 9 per cent. per year, a rate exceeded but twice in this port in twenty-five years, the last time being sixteen years ago, and the present rate of increase being the more remarkable because of the large figures with which we are now dealing. Enough then has been said, we believe, to demonstrate the fact that the Port of New York continues to grow at a very rapid rate. It is perhaps safe to predict that the foreign tonnage of the port will in 1950 amount to over 50,000,000, the value of the products of manufacture in Greater New York alone to \$3,500,000,000, and of the industrial district to \$5,000,000,000 and finally

the total population in New York City in 1950 will reach ten millions.

In our former report we gave a detailed description of Jamaica Bay and pointed out its advantages as a harbor. We will not repeat such description in detail in this report, but will merely point out such salient features as seem to require peculiar emphasis in view of the recommendations that will subsequently be made. The bay, first of all, is amply protected from storms, being bounded on the south by Rockaway Beach, which acts as a natural breakwater; it has 16,170 acres (25¼ square miles) of water surface, and its twenty-five miles of main-land waterfront are capable of providing room not only for a very large number of piers, but piers of any practical length it may be decided to make. Immediately adjacent to Jamaica Bay are 8,500 acres of salt marsh which, when reclaimed, will offer cheap sites not only for factories, but for the erection of homes for operatives, while in the interior of the bay are 4,200 acres of marsh which can either be applied to the same purposes or can be converted into a great municipal park. Railroad connection can be secured throughout the entire district through the agency of the New York Connecting Railroad, which is the line proposed to join the Pennsylvania and the New York, New Haven and Hartford systems. On the borders of Jamaica Bay at the present time live over 250,000 people, and throughout the entire city there is no section which has advanced in population at so great a rate as that which embraces the wards which abut against the shores of this bay.

We have estimated the population of Greater New York to reach 10,000,000 in 1950. That a large proportion of the estimated increase will be in the southeast corner of Brooklyn and in the southerly part of Queens may be seen from an inspection of Table 5, here presented, in which the density of the various wards throughout Brooklyn and Queens is indicated. As a means of comparison, we submit in connection with it Tables 6 and 7, which show the density of the population of Manhattan and the Bronx.

TABLE 5.

Showing Population, Acreage and Density of the Various Wards of the Borough of Brooklyn for 1910.

Ward.	Estimated population.	Acreage.	Density.
First	25,647	238.	110
Second	9,513	97.7	97
Third	21,112	161.4	131
Fourth	13,346	111.3	120
Fifth	20,797	119.4	175
Sixth	55,464	302.9	183
Seventh	50,824	458.5	111
Eighth	77,941	1,843.2	42
Ninth	52,524	623.6	84
Tenth	46,958	318.7	147
Eleventh	27,907	252.6	111
Twelfth	32,388	663.1	49
Thirteenth	23,119	230.3	100
Fourteenth	35,213	282.6	124
Fifteenth	35,933	244.8	146
Sixteenth	66,088	244.8	270
Seventeenth	76,639	823.3	93
Eighteenth	31,031	873.0	35
Nineteenth	46,208	413.8	112
Twentieth	29,276	461.5	63
Twenty-first	72,052	483.2	149
Twenty-second	84,015	1,361.6	61
Twenty-third	74,728	736.0	102
Twenty-fourth	60,550	1,198.5	50
Twenty-fifth	63,078	567.8	112
Twenty-sixth	134,115	5,690.0	24
Twenty-seventh	51,370	400.7	128
Twenty-eighth	97,820	894.4	111
Twenty-ninth	68,399	3,800.0	18
Thirtieth	55,911	5,404.1	10
Thirty-first	34,241	6,312.3	5
Thirty-second	21,237	8,300.0	2
Total	1,595,444	43,893.1	

Showing Population, Acreage and Density of the Various Wards of the Borough of Queens for 1910.

Ward.	Estimated population.	Acreage.	Density.
First	63,781	4,650	13
Second	33,322	14,700	6
Third	33,643	22,000	1
Fourth	59,604	36,000	1
Fifth	13,697	4,933	2
Total	259,052	82,883	

TABLE 6.

Showing Density per Acre by Assembly Districts.

MANHATTAN.

Ass. Dist.	Population, 1905.	Acreage.	People per acre.
First	24,030	520	46
Second	58,448	343	170
Third	59,041	230	256
Fourth	90,941	166	548
Fifth	38,613	277	139
Sixth	73,964	186	397
Seventh	42,246	297	142
Eighth	71,241	98	727
Ninth	47,057	264	178
Tenth	74,330	114	651
Eleventh	33,990	194	175
Twelfth	74,449	160	465
Thirteenth	40,879	188	218
Fourteenth	65,392	161	406
Fifteenth	40,944	124	330
Sixteenth	94,210	165	570
Seventeenth	44,898	226	198
Eighteenth	48,739	236	206
Nineteenth	77,903	600	130
Twentieth	44,392	186	238
Twenty-first	113,809	1,068	106
Twenty-second	51,762	218	237
Twenty-third	107,163	3,306	32
Twenty-fourth	60,161	348	173
Twenty-fifth	39,721	460	86
Twenty-sixth	60,108	224	268
Twenty-seventh	34,952	434	81
Twenty-eighth	51,842	166	311
Twenty-ninth	52,431	1,153	45
Thirtieth	61,696	220	280
Thirty-first	103,691	470	221
Thirty-second	105,156	573	184
Thirty-third	70,696	385	184
Thirty-fourth, part of..	43,743	278	157
Total	2,102,643	14,038	

Showing Density per Acre by Assembly Districts.

THE BRONX.

Assembly districts.	Population, 1905.	Acreage.	People per acre.
Thirty-fourth (part of)	65,888	1,029	64
Thirty-fifth	171,701	11,288	15
Annex	34,003	13,700	3
Total	271,592	26,017	

TABLE 7.

Average Densities in the Boroughs of Greater New York in 1905.

Borough.	Population.	Acreage.	People per acre.
Manhattan	2,102,643	14,038	150
Bronx	271,592	26,017	10
Brooklyn	1,358,686	43,898	31
Queens	198,240	82,883	2
Richmond	72,845	36,600	2

The foregoing tables are highly instructive; they show in the first place the fallacy of the statement made frequently in many quarters that Manhattan will reach its maximum population or density in 1910. The skyscraper has not only demonstrated its utility as a means of conserving the limited area of the Island for business and factory purposes, but it has likewise demonstrated the fact that it is adapted to apartment houses and to the housing of a very large number of people on a small plot of ground. Had we not noted this fact, in connection with Manhattan's population, we would have been led to this conclusion by observing the great increase in the value of Man-

hattan's manufacturing output referred to above, since, as a general rule, the increase in manufactures runs quite parallel to the increase in population. Another lesson to be learned from Tables 5 and 6 is this, that the Borough of The Bronx still seems to draw many people and can still take care of three and one-half millions of people before its average density will equal the average density of Manhattan. In any estimate of Brooklyn and Queens future population to be used as a basis of argument for proposed public improvements, sight must not be lost of the fact that in the distribution of the greater city's future population, The Bronx will receive its full quota.

The recent growth of manufacturing in Queens Borough (principally in Long Island City), amounting, as we have already pointed out, to a gain of 162 per cent. in five years (1900-1905), is a further confirmation of the fact. The opening of the Queensboro Bridge alone accounted for the purchase of a dozen large factory sites in Long Island City since the beginning of the year 1909. It has, moreover, been pointed out to us, and we have reason to believe, that one of the strong factors contributing to the success of the Bush factory buildings in South Brooklyn was the conversion of the Thirty-ninth Street Ferry into a municipal enterprise, thereby securing a more efficient operation of that means of transportation.

The foregoing is sufficient, we think, to demonstrate the fact that if any rule at all can be laid down for guidance in the preparation of plans for the improvement of lands near Jamaica Bay for the purposes of manufacture, it must be one founded on the principle that industrial establishments will keep pace with population and will, in all probability, follow instead of preceding growth in this direction.

HARBOR DESIGN.

By a close examination of existing harbors, it will be observed that the area of water surface, the area of land employed for handling and storing freight, the length of wharfage in use and the tonnage of the port all bear a comparatively fixed relation to one another. When the tonnage is noticeably above the average per unit of any one of the other factors, it will be found that the harbor is usually in a congested condition. Investigation of such matters has not to any great extent been taken up in this country, but several foreign engineers, notably the chief engineer of the port of Marseilles, M. Guerard, and J. Krauss of Delft, Holland, have carefully studied these matters.

We have carefully examined the data prepared by Mr. Krauss and have confirmed some features of it by actual investigation of certain portions of New York City's waterfront. This data reduced to tons of two thousand pounds and English units of measurement are largely summed up in the table which follows and which, as can readily be seen, offers a quick and quite reliable rule of determining the necessary capacity of each particular part of a port.

—Tonnage per acre.—			
Port.	Land and water.	Land surface.	Water surface.
Amsterdam	7,300	16,200	13,400
Antwerp	23,700	58,500	39,600
Hamburg	10,700	37,600	15,000
Dunkirk	9,300	21,800	17,400
Havre	9,300	39,200	14,600
Barcelona	4,850	19,800	6,500
Genoa	11,750	31,200	9,700
Marseilles	8,700	34,200	17,000
Buenos Ayres..	5,800	15,200	9,300
Rouen	8,500	15,700	11,200
Ave. 10 cities..	9,900	28,940	17,370

†Equals 69 meters.

*M. Gerard states that Surface of land Length of quay wall = 65 to 75 meters.

It will be seen that the following are fair average values:

Tonnage per acre of land and water combined	10,000
Tonnage per acre of land alone, about	25,000
Tonnage per acre of water alone, about	15,000
Width of land strip per lineal foot of wharf	250 ft.

In arriving at these averages the figures for the port of Antwerp were not used, inasmuch as it was reported that at the time the figures were taken the port was quite congested. Rotterdam and Hamburg were reported to be in satisfactory condition and therefore the averages should conform closely to the unit tonnage and distances as found for these ports. Compared with the average figures fixed upon by Mr. Krauss, the tonnages given above are light, but this result, as can readily be seen in more liberal estimates of space, or in other words, acts in the direction of providing a greater water surface and a greater land area than are actually required by the estimated amount of freight to be handled.

Another feature of a port is no less important than those which have preceded and that is the length of the quay wall or the wharfage required to adequately provide for the expected number of vessels or for the estimated tonnage. We have in one way already determined this for, in the data given above with reference to land width per foot of wall, it will be noted that this width, being based upon the same data as the land area in use, does in reality depend for its value upon the tonnage. It is simpler, for purposes of application, however, to have a rule expressed in tons per running foot. Investigations along these lines taking tonnage handled and dividing this by the actual quay wall in use in other ports give quite uniform results. Special inquiries made among property owners and shippers along the shores of Newtown Creek, Gowanus Canal, Erie Basin and other portions of New York Harbor give confirmation of the business that can be done in waterways without undue congestion. The following table gives the results of these investigations, some of them personally collected and the data from which the others were deduced being reliable. Leaving out of consideration the tonnage unit found for Antwerp, for the reason above given, namely, the fact that with this load the harbor was reported congested, it will be found that a very fair average value is 155 tons. The same authority quoted above (J. Krauss) after a very exhaustive inquiry, fixes upon 500 tons (1,000 kilos) per line meter of quay wall: this is equal to 168 tons (of 2,000 pounds) per linear foot. Mr. Krauss calls this a "rational and prudent average notwithstanding it might be increased if it were made to refer to some articles, coal, for instance."

TABLE 11.

Port or Docks.	Unit Tonnage.
Antwerp	374
Glasgow	176
Liverpool	148
Hamburg	135
Rotterdam	230
Havre	95
Dunkirk	124
Barcelona	132
Marseille	194
Genoa	182
Gowanus Canal, Brooklyn.....	250
Newtown Creek, Brooklyn.....	170
N. Y. Trans. Atlantic Piers.....	210
Certain Brooklyn Piers.....	60
Capacity of same.....	150
Erie Basin.....	70

15— 2,326

Average of all except Antwerp..... 155

One other consideration and we have done with the general subject of harbor

design. This has to do with the relation existing between population and foreign tonnage of ports. The accompanying table showing the per capita foreign tonnage of the principal cities in the United States needs no explanation or remarks upon our part.

TABLE 12.

Per Capita Tonnage of Various Ports in 1900.

City.	Population.	Tonnage (Foreign).	Tons per Capita.
New York.....	3,437,202	16,020,290	4.7
Philadelphia ...	1,293,697	3,736,615	2.9
Boston	560,892	3,145,187	5.6
Baltimore	508,957	3,452,654	6.8
San Francisco..	342,782	2,691,366	7.9
New Orleans....	287,104	3,395,442	11.8
Charleston	55,307	147,652	2.7
Savannah	54,244	611,123	11.3
Portland	50,145	717,001	14.3
Norfolk	46,634	592,887	12.6
Mobile	38,469	1,054,471	27.3
Galveston	37,789	1,541,500	40.8
Total	6,713,222	37,106,188	5.5

We have now considered practically all the elements entering into the problem and have reduced them to a question of tonnage so that we may safely assume that when the tonnage of a port or harbor is given, the dimensions of the various features may be approximated very closely.

Reviewing what has preceded we may set down the following average values for the various factors entering into the problem:

1st—Tonnage (of 2,000 lbs.) per acre of land and water combined	10,000
2d—Tonnage (of 2,000 lbs.) per acre of water surface	25,000
3d—Tonnage (of 2,000 lbs.) per acre of land surface	15,000
4th—Tonnage (of 2,000 lbs.) per linear foot of wharf	155 to 168
5th—Tonnage (foreign and net registered) per capita	5.5
6th—Width of land adjacent waterfront per linear foot of wharf	250

In order that liberal allowances be made in consequence of fortunate conditions, we shall, in making application of these values in the determination of the extent of the initial improvements use for items 4 and 5, respectively, the figures 150 and 6, since both of these will necessitate the provision of more wharfage than would be required if we adhered strictly to results obtained in our investigations. It must not be forgotten, however, that the 4th item refers to cargo or freight tonnage while the 5th item refers to net registered tonnage. Respecting item 6th, we may remark that it can, in a measure, be disregarded, since the territory adjacent to the waterways in Jamaica Bay is so ample and comparatively cheap as not to necessitate restrictions in this direction.

EXTENT OF IMPROVEMENT.

We have now to consider what shall be the extent of the improvement of Jamaica Bay; how much can be economically spent, and what the probable returns to the city will be. Noting this we wish first to repeat here the government's proposal:

First—To dredge a channel 18 feet deep and 500 feet wide through the entrance to the beginning of the main channel at the southeast corner of Barren Island	\$250,500.00
Second—Increase the dimensions of this channel	

to 30 feet by 1,500 feet, estimated cost	1,016,500.00
Third—Construct east jetty, if it proves to be necessary, estimated cost	724,500.00
Fourth—Construct west jetty, if it should become necessary, estimated cost	589,500.00
Fifth—Contingencies	129,550.00

Total	\$2,710,050.00
Main channel, 59,000,000 cubic yards at 8 cents	4,720,000.00

Total	\$7,430,050.00
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The Chief of Engineers, after concurring in the opinion of the District Officer and the Board of Engineers for Rivers and Harbors that Jamaica Bay is worthy of improvement in accordance with some progressive plan for joint prosecution by the United States and the local authorities, expresses the opinion that "The United States should not at this time be committed further than to a project for securing a depth of eighteen feet, as provided in the first step of the progressive movement recommended in the reports herewith. Any further improvement should be clearly shown to be in the interest of commerce."

The estimate of cost to the United States until such time as the needs of commerce demand the ultimate improvement amounts therefore to this:

(a) Dredging 18-foot entrance channel	\$250,000.00
(b) 500-foot main channel, 18 feet deep, 16,000,000 cubic yards (estimated by the Jamaica Bay Improvement Commission), at 8 cents	1,280,000.00
(c) Contingencies, 5 per cent	76,500.00

Total	\$1,606,000.00
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Assuming that this estimate of cost proves correct, the capital investment necessary to produce this at 4 per cent. amounts to \$1,390,000. The total investment of the government amounts, then, to \$2,996,000, or, say, \$3,000,000. It is our opinion that the total expenditure upon the part of the city should not greatly exceed an amount approximating this until such time as the demands of commerce require greater facilities. The actual initial expenditure should, however, be sufficient to make the improvement complete in every particular over a territory large enough to take care of the expected tonnage of the district for the next ten years.

Now, in order that the present population may not be unduly taxed, it is essential in fixing the extent and character, not only of the more detailed plan of improvement, but likewise of the general plan, to determine the date for which such improvement should be planned and the actual requirements in the way of wharfage at the time specified. If the general plan provides waterfront facilities to take care of the estimated needs up to 1950, and if the more detailed plan provides the same up to 1920, or for a period of ten years after the beginning of the construction, they will, we think, be amply sufficient. That the plans presented herewith make such provision can be readily demonstrated.

We have estimated that the population of the entire Borough of Brooklyn will in 1950 be 4,500,000, or, including the Fourth Ward, Queens, 5,220,000. This is a liberal estimate, since in making it we have assumed that the present rate of increase will be maintained, and this, we are aware, is somewhat excessive since rates of this nature are known to slightly decrease with growth in numbers. The area of Brooklyn is about 43,900 acres, so that the density or number of people per acre will in the year cited average about 102. With Brooklyn's immense waterfront, much of it already highly developed, particularly in the territory near the larger part of the consumers in all bor-

oughs, and hence, as we have seen, likely to hold a heavy percentage of the entire trade, it is not to be supposed that the Jamaica Bay waterfront will do more than secure that portion of the port's business which is proportional to the population residing in a zone entirely tributary to the bay itself. To determine what this proportion amounts to it is necessary to make an estimate of what this tributary area consists. We have assumed, therefore, for the purpose of what follows, that all of the Twenty-sixth and Thirty-second wards in Brooklyn, one-half the Twenty-ninth Ward in the same borough and two-thirds of the Fourth Ward (Jamaica) in Queens Borough, are in this tributary zone. We have not included the Fifth Ward, Queens, since the present plan contemplates channels on the west and north sides of the bay only, and this would have but a slight effect upon the population in the Fifth Ward or the Rockaways. The estimated population in 1950 of this zone is as follows:

Twenty-sixth Ward, Brooklyn.....	420,000
Half of Twenty-ninth Ward, Brooklyn..	187,500
Thirty-second Ward, Brooklyn.....	190,000
Two-thirds of Fourth Ward, Queens...	480,000

Total	1,277,500
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The total population then of these wards will amount to 1,277,500 or about one-quarter of the entire population of Brooklyn, plus the population of Jamaica. This large number or high ratio is due to the great acreage of these wards since the above-mentioned Brooklyn wards taken together form forty-two per cent. of the entire acreage of the Borough of Brooklyn, while the Town of Jamaica, now the Fourth Ward in Queens, constitutes thirty per cent. of the total area of the Borough of Queens. If we now suppose that the waterfront of Jamaica Bay is in the future to take care of a foreign tonnage proportional to the population of these wards, then applying the unit 6 arrived at in a previous section and a population of 1,277,500, we will note that the foreign tonnage to be taken care of in 1950 will amount to approximately 7,665,000. That none of these figures are small will be admitted, we think, when it is remembered that a tonnage of this size is almost equal to the total tonnage of the entire harbor of the city of San Francisco at the present time, and is equal also to forty per cent. of the total foreign tonnage of the whole port of New York in 1905. We might here add also that the allowances for population appeared to be extremely liberal and that this so appears from the fact that the present density of the Twenty-sixth Ward is below 25 per acre, while the estimated density for 1950 is 74. The present density of the Twenty-ninth Ward is 18 per acre, while the estimated density for 1950 is 99. The present density of the Thirty-second Ward is 2½ per acre, while the estimated density for 1950 is 23. In like manner the present density of the Fourth Ward, Queens, is now 2½ per acre, while the estimated density for 1950 is 31, notwithstanding its great area of 23,000 acres. As a means of comparison so that a full appreciation of the significance of what this density means may be had, we may state that the present density of the Twenty-second Ward, Brooklyn, is about 55, and that of the Eighth Ward, Brooklyn, 35. The two assembly districts immediately adjoining Central Park on the west, while they may be regarded as residential districts, are closely built up, as is well known, and yet have densities, respectively, of 108 and 82.5.

If the foreign tonnage of Manhattan alone is assumed to be one-half the total of the whole port, it would amount now to about 12,500,000 or but 1½ times that we have assumed for Jamaica Bay in 1950; certainly a liberal allowance. The next step is to apply to this estimated foreign tonnage (7,665,000) a proper unit amount of wharf length as heretofore determined, namely, one foot for each one

hundred and fifty tons of foreign business.

This unit figure of intensity of tonnage, it is to be remembered, has reference to tons of two thousand pounds, or in other words, to cargo or freight tonnage, while the foreign tonnage estimated for Jamaica Bay in 1950 is net registered tonnage. It becomes necessary, therefore, before making application of the rule to apply a correction to the estimated foreign business so as to express it in terms of freight tons.

For 1908 the foreign or net registered tonnage for the port of New York is given in the United States Statistical Abstract as 24,094,744 tons, whereas in the report of the chief of engineers, 1909, appendix F, page 1,094, the total imports and exports of the port for the same year (1908) are stated as 12,541,419 tons. The freight tonnage of the port of New York therefore constitutes but fifty-two per cent. of the net registered tonnage. This is a low ratio as compared with most ports and is due perhaps to the presence in this harbor of so many large passenger vessels which have a very high registered tonnage, but which, owing to their size, are obliged to travel frequently with partial cargoes. For our purpose it is safer, therefore, to take a figure arrived at by J. Krauss after an exhaustive examination of many of the harbors of the world, namely, 0.65. If now we apply this ratio to the foreign trade estimated for Jamaica Bay in 1950 or 7,665,000 tons, we will find that the weight of material to be taken care of on the wharves will be that figure multiplied by .65 or 4,982,000 tons. It is to this figure that we must apply the unit of wharf length. It will be found that 33,200 linear feet of wharf will be required.

From the southeast corner of Barren Island to Cornell's Creek, the actual frontage available, using only the main bulkhead and no basins, amounts to 45,000 linear feet. It is, however, unlikely that the harbor will develop along these lines, and that after a time demands will be made for greater wharfage length in a more concentrated section necessitating the use of piers. Since the general plan as at present offered is able to provide for piers at least 1,000 feet long depending upon whether or not they are placed at right angles to the shore or bulkhead, the shore front between the points mentioned is capable of providing at the very lowest calculation four times as much wharf room as the actual distance between the extreme points would indicate. In other words, it is able to produce four times 45,000 or 180,000 linear feet of wharfage, and this length, as can readily be seen, is equal to nearly five times that which would seem to be required. The same method of computation applied between the southeast corner of Barren Island and Spring Creek gives the following:

	Linear Feet.
Distance required	33,200
Wharfage available along main bulkhead	28,000
Wharfage available, using piers..	112,000

This 112,000 linear feet is equivalent to more than three times that which appears to be actually necessary to do the work required.

This is true as to actual distance required for all the purposes of commerce up to the year 1950. It would seem more desirable, however, not to make the development begin at Barren Island and extend continuously around the bay, thereby keeping Queens Borough, and particularly Jamaica, waiting, but rather to select some point—say at Fresh Creek Basin—and make the improvement grow both ways from this point as a center. In this way immediate demands would be at once satisfied, the improvement would at all times grow not only with the population, but likewise in the direction in which the latter grows, and would be, therefore, a logical growth. While not essential, it is interesting to know just

what frontage will be taken up in this manner. With 33,200 linear feet required, and assuming the erection of piers as fast as needed, the actual frontage in use would be 33,200 divided by four, which is equal to 8,300 linear feet, or, using Fresh Creek Basin as a center, the improvement would, in 1950, range from a point about 3,000 feet west of Fresh Creek Basin to a point near Spring Creek Basin.

As time goes on, local causes may demand that, instead of being entirely concentrated, the development of the bay be scattered so that it seems reasonable to suppose that there will be some improvement on the line joining Barren Island to Bergen Beach; some at the mouth of each basin emptying into the bay, and the great mass of the business concentrated near the point we have designated.

In all the foregoing we have purposely kept out of consideration the immense frontage available in the basins. There are six of these planned, and the aggregate wharfage provided amounts to 75,000 linear feet. We have excluded this for the reason that in our calculations to determine the wharfage required, we used only foreign tonnage, and as the coastwise and domestic commerce will be considerable we have left the basins available so as to provide for this, not that we anticipate the entire foreign tonnage will of necessity be concentrated on the exterior wharves while the domestic commerce will use the basins, but merely for the purpose of assuring ourselves that taking basins and main bulkhead together we would have sufficient room in the present plan to provide berths for all the shipping that any man can at this time assume will be done in Jamaica Bay in 1950. If provision can be made for the estimated foreign tonnage for 1950 along the main waterfront between a point 3,000 feet west of Fresh Creek Basin and a point just east of Spring Creek Basin, as has already been demonstrated, we believe that these two basins with the aid of Paerdegat with their combined wharfage length of 46,000 feet and a capacity of over 7,000,000 tons, can readily provide all the accommodation necessary for domestic commerce for the next forty years.

We have indicated above how unnecessary it is for the city to immediately carry out the total improvement shown on the map accompanying the report of Colonel Knight, namely, from the southeast corner of Barren Island to Cornell's Creek. We shall now attempt to estimate what this improvement would cost The City of New York. The plan, it must be remembered, calls for a 500-foot channel 18 feet deep, this to lie outside of a pierhead line, which is 1,000 feet away from the line of solid filling. Later the channel is to be widened to 1,000 feet and deepened to thirty feet. The increase in width will naturally be on the side farthest removed from the shore. It follows, therefore, that the city must, in order to utilize its bulkhead and waterfront, excavate the intermediate portion lying between the inside of the channel and the bulkhead line, and this should approximate a depth equal to the preliminary 500-foot wide channel. When the commerce of the harbor has so grown as to necessitate increasing the size of the main channel, then it is quite likely that piers will be demanded and that it will only be necessary to deepen to thirty feet that portion inside the pier line which is between piers. It was with this assumption that the estimate was prepared. It follows, therefore, that the city's expense for this enterprise would be as follows:

Main channel, 59,000,000 cubic yards (Colonel Knight's report), at 2 cents	\$1,180,000
Excavation between bulkhead and pierhead lines, estimated 28,000,000 cubic yards, at 10 cents.....	2,300,000
Deepening between piers, 12,200,000 cubic yards, at 10 cents.....	1,220,000
Excavating basins, 13,700,000 cubic yards, at 10 cents	1,370,000
Land necessary to be purchased to retain all filling, 3,000 acres at \$1,000 per acre	3,000,000

Bulkhead, 120,000 linear feet, at \$50....	6,000,000
One hundred piers, 1,000 feet by 150 feet, 15,000,000 square feet, at \$1.25..	18,750,000
Sheds for same, 15,000,000 square feet, at \$1	15,000,000
Curbs, sidewalks, pavements, local sewers, water mains, 4,500 acres, at \$2,400 per acre	10,800,000
Contingencies	3,000,000
Total	\$63,120,000

We have not included in the above estimate the loss due to receipts from taxes due to the city taking over the lands to be filled since this item, while considerable, is difficult to ascertain and bears but a small ratio to the estimate of cost for improvement and development given above. When it is remembered that this sum of money, \$63,120,000 is equal to the entire amount spent for like purposes by the Department of Docks and Ferries throughout the entire city since its creation in 1870, it is not hard to believe that no such sum of money will find its way into Jamaica Bay in any like period of time. We have introduced it merely for the purpose of calling attention to and emphasizing the great extent and capacity of Jamaica Bay and to show that its development will necessarily be a work of time. Jamaica Bay will grow like other places of a like nature have grown in the past, slowly and steadily. It is sound municipal policy to help its progress the same as it would be to help any other part of the water front in order that commerce, shipping and manufacturing may be encouraged within the city's limits.

Before giving the details of the plan of improvement proposed in this report, we shall attempt to show that in the early development of the waterfront of Jamaica Bay it is more economical for the city to utilize the main bulkhead for wharf purposes rather than to make use of piers. In doing this we are to remember that if the pier method is adopted, the commerce naturally will be more concentrated and in consequence less actual waterfront will be necessary, less land developed and less main channel required.

For the purpose of making a comparative estimate of the cost of the development by each method, and the returns therefrom, we have selected as the most promising site for the improvement that portion of the waterfront lying on both sides of Fresh Creek Basin. Assuming that 8,000 linear feet of wharf will be required, it will readily be seen that two piers on either side of the basin, each being 150 feet wide with a slip 350 feet wide intervening will be necessary. This plan will utilize about 900 feet of main frontage on both the east and west sides of the basin and will cause in conjunction with the excavation to be made in the basin itself a development of about 600 acres of land. By the second method that without piers 8,000 running feet of bulkhead will be necessary, one-quarter of which will be to the west of Fresh Creek and the balance to the eastward. The acreage reclaimed under this plan including that due to the dredging from the basin will approximate 800 acres.

Below will be found a comparative estimate based upon the foregoing assumptions. We may add that in the preparation of the estimates very liberal allowances were made in favor of the pier method, since if we had adhered to a very strict analysis of the problem a smaller area of fully developed territory would have resulted in this case. As it was somewhat difficult to assume any set of conditions which would have precisely satisfied both methods, it was thought safer to give the benefit of whatever doubts we had to what was thought to be the less profitable plan.

The object of making the comparative statement presented was merely for the purpose of convincing ourselves which of the two was the proper plan to pursue in the early stages of development. It appears from the figures submitted that

there can be no doubt as to which course it will pay the city to follow. With the use of piers, the net return is the difference between 6.85 per cent., the gross income, and 4 per cent., the usual interest paid by the city on its bonds, or 2.85 per cent., while without piers and using only the bulkhead, the net return is 4.2 per cent. These figures indicate that by building piers the yearly loss would be about 1.35 per cent. upon a total investment of approximately \$5,000,000, or \$67,500 yearly. Expressed in still another way the bulkhead plan is one and one-half times more profitable than the one employing piers. It is true, as we have already said, that future conditions may arise which will demand the construction of piers, but until such necessity is demonstrated, or until deeper water is demanded, we unhesitatingly recommend that bulkheads only be utilized, thereby bringing into requisition a greater length of waterfront and a larger area of development.

COMPARATIVE ESTIMATE OF COST OF IMPROVING PART OF THE SHORE FRONT OF JAMAICA BAY IN THE VICINITY OF FRESH CREEK BASIN.

(a) Using Bulkhead and Piers on the Main Front and Bulkhead only in the Basin.

500 foot channel approach between a point 2,000 feet west of Fresh Creek, and a point 900 feet west of Fresh Creek, 406,300 cubic yards, at 2c.....	\$8,100
Excavating 500 foot channel in front of development, 786,000 cubic yards, at 2c.	15,700
Excavation between bulkhead and pier-head in front of development, 1,400,000 yards, at 10c.....	140,000
Excavation, Fresh Creek Basin, 3,577,000 cubic yards, at 10c.....	357,700
Bulkhead, 19,800 linear feet, at \$50.....	990,000
Land to be purchased, 575 acres, at \$1,000	575,000
Land to be developed, 605 acres, at \$2,400	1,452,000
Four piers, 600,000 square feet, at \$1.25.	750,000
Sheds for same, 600,000 square feet, at \$1	600,000
Total	\$4,888,500

Of the 605 acres developed above, all but 400 acres will lie in a system of streets.

Of these 400 acres, we have set aside a strip 100 feet wide, running entirely around the waterfront of the bay and basin, for the purpose of securing the greatest possible return upon the waterfront. This strip comprises 40 acres. Below follows an estimate of the probable return upon this developed land, assuming that it is not sold but leased:

Strip consisting of 40 acres, leaving out streets, which intersect same, 1,790,000 square feet, at 10c. per sq. ft. per year	\$179,000
Balance of tract consisting of 360 acres, or 6,300 lots, at \$25 per lot per year....	157,500
Total return upon an investment of \$4,888,000	\$336,500
Or a gross return of 6.88 per cent.	

(b) Bulkheads Only Throughout.

500 foot channel, in front of development, 3,000,000 cu. yds. at 2c.....	\$60,000
Excavation between bulkhead and pier-head, 6,000,000 cu. yds. at 10c.....	600,000
Excavation, Fresh Creek Basin, 3,577,000 cu. yds., at 10c.....	357,700
Bulkhead, 26,000 feet, at \$50.....	1,300,000
Sheds, 8,000 ft. by 75 ft., or 600,000 sq. ft., at \$1	600,000
Land to be purchased, 671 acres, at \$1,000	671,000
Land to be developed, 803 acres, at \$2,400	1,927,200
Total	\$5,515,900

An Estimate of the Return Upon the Investment Follows.

2,336,000 sq. ft. comprised in a strip 100 feet wide along the entire waterfront, at 10c. per sq. ft., per year....	\$233,600
500 acres, exclusive of street system and excluding also strip referred to above; equivalent to 8,750 lots, at \$25 per lot	218,750
Total income	\$452,350
Or a gross return of 8.2 per cent.	

MAPS AND PLANS.

It is proposed to develop fully a tract of land approximately 625 acres in extent lying in the vicinity of Fresh Creek Basin. To do this it will be necessary to dredge out the entire basin as well as that portion of the bay itself which lies immediately in front of the proposed improvement, the width of the strip to be so dredged including the 500 foot wide channel proposed in the tentative agreement between the War Department and this commission being 1,500 feet. From Barren Island to the site of the proposed development the 500 foot channel will have to be excavated to provide a proper approach. All dredging is to be carried to a depth of 18 feet at mean low water, and all material dredged is to be deposited upon the land side of the bulkhead line and is to be used in reclaiming the adjacent marsh land and land under water. To properly retain this filling it is suggested that a substantial bulkhead be built entirely around Fresh Creek Basin and along the Jamaica Bay front for a distance of 2,910 feet west of Fresh Creek Basin and for about 1,400 feet east thereof. The grade to which the filling will be brought is to conform to the requirements of the Highway, Sewer and Dock departments of the city.

That portion of the waterfront which lies between Barren Island and the westerly end of the proposed developed portion of the bay will not, in our opinion, require anything in the shape of a permanent bulkhead, since it is extremely doubtful, for reasons already stated, if much use will be made of this section for many years. It is merely for the purpose of reducing the cost of the dredging and of carrying out the provisions of the tentative agreement referred to above that it appears necessary at this time to provide a strip of land and land under water to receive the dredged material to be excavated from the 500 foot channel in this neighborhood. It is probable that the material removed by suction dredges could be heaped up along the bulkhead line in such a way as to serve as a retaining structure for the balance of the fill, but we have thought it wiser in preparing the estimate of cost to include a sufficient amount to cover the expense of constructing a rip-rap wall from Barren Island to Canarsie Park, and so placed as to serve as an essential part of a more permanent structure to be built when necessary. This wall can be placed in a dredged trench so as to be secure against being pushed out of line and so as not to require any change whatsoever when the permanent bulkhead is built.

ESTIMATE OF COST OF INITIAL IMPROVEMENT.

Dredging 500-foot wide channel approach 18 feet deep, allowing one foot for over-depth and side slopes of one on three, and including portion in front of proposed improvement, 8,000,000 cubic yards at 2c. (city's share of cost)	\$160,000
Dredging between bulkhead and pier-head lines 18 feet deep, with allowance for one foot over-depth and including portion in front of Fresh Creek Basin, 2,800,000 cubic yards at 10c.....	280,000

Dredging, Fresh Creek Basin, 18 feet deep, 3,500,000 cubic yards at 10c.....	350,000
Timber and concrete bulkhead around Fresh Creek Basin:	
4,200 linear feet at \$65.....	\$273,000
18,600 linear feet at \$35.....	651,000
17,000 linear feet of rip-rap wall from Barren Island to west side of proposed improvement, but excluding certain portions already improved by individuals, 10 cubic yards per running foot, or 170,000 cubic yards at 75c. per cubic yards	127,500
Purchasing 570 acres of marsh land at \$1,000 per acre	570,000
Developing with pavements, curbs, sidewalks, sewers and water mains, 625 acres at \$2,400	1,500,000
Total	\$3,911,500
Engineering, contingencies, etc.....	195,500
Total	\$4,107,000

If we deduct from the cost of the land, which would in all probability prove profitable to the city whether the channel was dredged or not, the cost of actually improving the site which we have discussed would be \$3,341,500 plus the engineering and contingency expense, bringing the cost up to about \$3,500,000. This figure closely agrees with that which we assumed at the outset would be a fair and prudent investment by the city until such time as the commercial practicability of the enterprise was proven, and until it can be shown that the entrance to Rockaway Inlet can be maintained at reasonable cost. It will be remarked also that by appropriating this amount of money, the City of New York indicates its intention to become a partner with the Federal Government in carrying on the improvement of Jamaica Bay.

We are convinced that the city will be able to obtain a fair return upon an investment of this kind. In order to demonstrate this we have prepared the following estimate of the probable returns from the investment. In the preparation of this we have assumed that a strip of land 100 feet in width lying immediately adjacent to the bulkhead is by far the most attractive to lessees, and that a low rental for such property would be at the rate of ten cents per square foot annually. In all other parts of one cent per square foot, or, in other that a fair rental would be at the rate of one cent per square foot, or, in other words, that a man leasing a single lot 25 feet by 100 would pay The City of New York \$25 per year. We have also estimated that of the entire acreage one-third will be required for streets so that we have only figured on 12 lots per acre for the entire acreage in calculating the return received from all sources. Based upon these assumptions the following seems to be a fair and impartial estimate of what the city may expect from the complete development of this particular site:

100 feet wide strip along the entire waterfront of 22,000 feet, but deducting an amount equal to the aggregate widths of all streets intersecting the same, or 1,988,000 square feet, at 10c. per square foot, per year	\$198,800
Balance of tract consisting of 360 acres, including streets, but allowing 12 lots per acre, gives 6,900, which at \$25 per lot returns	172,500
Total revenue	\$370,500

Since the total cost of the improvement, including the land, is \$4,107,000, we can readily see that the gross return upon the investment to the city will be 9 per cent., or a net profit when the land is in complete use of about 5 per cent.

The direct return to the city, however, is the least part of the financial advantage resulting from the improvements outlined. The real benefit accrues to the merchant, manufacturer, dealer, or, in other words, to the consumer.

We have taken the trouble to compare the freight rates upon a ton of cement from the Lehigh Valley Cement district

to Canarsie landing by water and by the present means of transportation. The result of this inquiry appears from the following

Cost of one barrel of cement from the Lehigh Valley section to Canarsie Landing is	\$1.45
Cost of same, f. o. b. cars of the Long Island R. R. to the nearest point in East New York is	1.53
Saving by water	\$0.08

If we assume five barrels to the ton, the total saving would be forty cents. It is of course true that the savings upon other commodities may not be so large as this, but we believe that it is not unfair to suppose that a saving of twenty-five cents per ton could be effected by the improvement. As we have estimated the total tonnage of the district tributary to Jamaica Bay at the present time to be about 2,000,000 tons, it is not difficult to believe that the saving to the consumer would be considerable.

SUMMARY.

The conclusions which the commission have reached in regard to the improvement and development of Jamaica Bay may be briefly summed up as follows:

First—That the growth of the port of New York warrants and justifies a substantial improvement of Jamaica Bay.

Second—That any such improvement of the bay should, however, be carried on cautiously until the success attending the Federal engineers' efforts to improve and maintain an entrance channel through Rockaway Inlet is assured.

Third—That the improvement suggested herewith should be carried on at the same time and not before the dredging of the inlet channel.

Fourth—That the real and substantial benefit to be derived during the first ten or fifteen years following the dredging of the preliminary inside channel will result from the means afforded of cheaply supplying building material and supplies to the territory immediately adjacent to the bay, and in this manner not merely assisting in but actually promoting its growth.

Fifth—That growth in population thus stimulated will continue to increase at a rate much greater than the average neither for the city or of the Borough of Brooklyn.

Sixth—That manufacturing will increase in proportion to the growth in population and may possibly assist advances in this direction.

In view of the above, it is recommended:

1. That the City of New York proceed with the improvement of Jamaica Bay along the lines suggested herewith as soon as appropriations for the said improvement are made by the City of New York and by the Federal Government.

2. That physical improvements be commenced which shall cost, when complete, \$3,500,000.

3. That such lands as are necessary to satisfy the requirements of the initial improvement, as more particularly outlined in the next paragraph and as given in detail in the body of the report, be acquired by condemnation or purchase before beginning physical improvements, and that such other lands as are required to retain dredgings from the various channel extensions should be acquired in the same manner when needed, or before such necessity arises if favorable terms can be secured.

4. That the \$3,500,000 recommended to be appropriated for the physical improvement should be used in the following manner:

(a) To defray city's share of the cost of dredging an approach channel 18 feet deep at mean low water and 500 feet wide from the southeast corner of Barren Island, north and east to a point 1,400 feet east of the east side of Fresh Creek Basin.

(b) To dredge all of the Fresh Creek Basin to a depth of 18 feet at mean low water.

(c) To build a substantial bulkhead around all of the Fresh Creek Basin and on Jamaica Bay front for a distance of 2,910 feet to the west and for a distance of 1,400 feet to the east of the said basin.

(d) To build, if found necessary to retain filling from 500 foot wide approach channel 18 feet deep from Barren Island, north and east to the beginning of the suggested complete initial improvement, a rip-rap wall, the same to constitute a portion of the finished bulkhead when the latter shall be required by the demands of commerce.

(e) To dredge space between bulkhead and pierhead lines to a depth of 18 feet at mean low water wherever permanent bulkhead is in place.

(f) Develop fully with sidewalks, curbs,

pavements, local sewers, water mains, etc., about 625 acres of land lying adjacent to Fresh Crook Basin as indicated upon the plan herewith submitted.

5. That when the commerce of the bay shall require it, the 500 foot wide channel is to be extended easterly beyond the easterly point mentioned in 4(a), but that no such extension shall be inaugurated until the above outlined improvements shown on the map referred to in 4(f) have been completed.

6. That inasmuch as the legislative act (passed May 29, 1909), whereby the State of New York grants to the City of New York such right, title and interest as it may have in and to the land under water in Jamaica Bay, does not become operative until the United States Government makes its first appropriation for the improvement of the bay, or until the City of New York sets aside not less than \$1,000,000 for the same purpose, your board, to take advantage of the terms of this act, should at its earliest convenience set aside \$1,000,000 for the improvement.

7. That as soon thereafter as possible, the balance of the \$3,500,000 should be appropriated in order that the Secretary of War, if he so desires, may report that the City of New York is ready to perform its part of the initiatory work called for in his report of February 26, 1909, as well as to give the committee of Congress an opportunity to incorporate an adequate appropriation in the river and harbor bill of this session.

8. That the harbor lines, as indicated and as located by rectangular co-ordinates on the plan shown on Plates III and IV, should be adopted, but that a slight change in the bulkhead line at the northerly part of the bay and also in the location of Spring Creek Basin, seems desirable, as explained in the body of the report. This change, however, cannot be made until more precise data as to the street system is obtained.

9. That, if the Barge Canal Terminal Commission, upon completing its investigations and studies, decides that the prospective business of the canal warrants the selection of Jamaica Bay as a terminal, the city should afford the aforesaid commission every opportunity for the establishment of such a terminal. Respectfully submitted.

PHILIP P. FARLEY,
JOHN J. McLAUGHLIN,

Commissioners.

Extracts From Minority Report, Jamaica Bay Commission

DREDGING AND FILLING.

The character of the bottom of Jamaica Bay generally and the ease with which the sand may be transferred comparatively long distances to lowlands, make the dual achievement of creating channels and reclaiming land there a most economical one.

It has been found necessary to build around parts of Manhattan massive and costly sea walls, which would not be the case in this bay, a very much lighter and less costly structure answering almost every requirement.

It is interesting to note the relative cost of some of these sea walls and of dredging channels per unit of frontage:

Average cost per running foot, including general charges, of sea walls in Manhattan:

(1) Rock bottom type	\$307.00
(2) Firm or hard bottom type	396.00
(3) Relieving platform type	491.30
(4) Average of the three types	364.77

Let us compare this with cost of dredging in Jamaica Bay:

(5) The cost per running foot for dredging a channel 2,000 feet wide and 30 feet deep (allowing for no previously existing channel whatever), at 12 cents per yard	\$266.67
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The length of sea wall about Manhattan exceeds 36,000 feet. Were the total cost of

this sea wall applied to the proposed improvement in Jamaica Bay, it would probably pay for putting in an adequate bulkhead and dredging a zone 2,000 feet wide outside of it to a depth of thirty feet all the way from Barren Island around the "mainland" to the trestle of the Long Island Railroad, an approximately equal distance, besides the reclamation of several thousand acres of adjoining meadow land.

It is particularly fortunate that not only can an immense amount of dredging be gotten rid of on the lowlands close at hand at perhaps one-third of what the cost would be were the lowlands not there, but that the lowlands positively need these dredgings to bring them into a state of productiveness, and the cost of

reclaiming them by dredgings from the proposed channels is less than one-third of what it would be were the channel not to be made.

Under such circumstances, fill being absolutely necessary and dredging being the cheapest way of providing it, irrespective of any connection with navigation, the depth to which the channels may be made for navigation is only restricted to that at which the centrifugal pumps can work effectively.

Depth of channels means increased availability. It not only gives access to freight carriers which can through the economies of their great capacity transport commodities at a minimum of cost, thereby lowering through competition the standard rates to and from the port, but it gives a distinct trade advantage over rival ports which are unable through lack of water to harbor these low-rate producing vessels. The encouragement of the type of vessels of great carrying capacity, but relatively low speed, would trend toward the attainment of the low freight charges so necessary to the growth of a port.

The cargo of a tramp ship not infrequently includes the product of 15,000 acres of average wheat land, or the cotton yielded by twice that area, and it would take two such cargoes to fill the hold of one of the larger freight liners. A larger cargo means a greater amount of freight carried, or an increased opportunity to lower rates in bidding for business—or it may be both of these advantages. A vessel carrying 250,000 bushels of grain earns \$3,000 more than a vessel whose capacity is limited to 200,000 bushels, assuming the rate to be six cents per bushel on each, or on a cargo of 20,000 bales of cotton, a ship receives \$10,000 freight in excess of another ship which carries only 15,000 bales, assuming the rate to be \$2 per bale.

Within very recent years there has been a considerable change in the thought as to the desirable length of piers, and the tendency has been to lengthen them where the location of the pier line would permit. Notable examples of long piers are those in the Chelsea district (800 and 825 feet), Manhattan; the Bush docks (1,300 to 1,400 feet), in South Brooklyn already constructed, and the ones more recently planned by the Department of Docks and Ferries, also in South Brooklyn.

In the writer's opinion, a desirable distance between the actual (physical) bulkhead and the pier line would be 1,000 feet. This will allow for the berthing of single vessels of great size, or through use of the diagonal system, as recommended in the first report, the berthing of two or more moderately large vessels on one side of a pier 1,400 feet long.

The economy of space is the same in the cases of the rectangular and diagonal pier systems, though the facility of entrance to ships in favor of the latter, and as it is impossible to foretell to what maximum lengths the vessels of the future may go, the writer recommends that the diagonal system be adopted throughout, particularly so since a change to it later on would be difficult.

While the immediate demands of the bay will not require any such length of piers, the establishing of such a pier line does not prohibit or restrict the use of short piers at the present time, and it does provide a probable safeguard against the repetition of an occurrence like that in the Chelsea district.

It will be interesting to note the following table given by Sidney Willett Hoag, jr., in his paper read before the Municipal Engineers Club, referred to elsewhere, as to percentage of wharfage devoted to different uses along parts of the North and East rivers. Mr. Hoag's

statement of these percentages may be taken as standard:

	North River Below W. 72d St.	East River Below 3d Ave.
I. Foreign steamship service.....	1.0	0.1
II. Domestic steamship service.....	11.1	3.2
III. Gen. & miscellaneous commerce.....	38.4	16.3
IV. Railroad business	31.0	5.0
V. Special kinds of commerce.....	5.0	2.8
VI. Ferries	6.4	5.6
VII. City Departments	1.1	5.6
VIII. Unimproved	0.	16.9

Taking the average total net increase of wharfage for New York City, given by the Newark commission (page 10 in their report), as 15,000 per annum, there would be required over 600,000 linear feet of new wharfage by 1950 for the use of all activities, while the rate of net new wharfage as shown by the records of our own Department of Docks and Ferries for the past seven years, during which accurate data has been collated, is 17,867 feet (approximating three and one-third miles) annually, or over 700,000 feet (over 130 miles) additional for 1950.

This cannot possibly be cared for without a very material development of Jamaica Bay.

It should be borne in mind that the mammoth high efficiency piers now being built in the present port, resembling in a way the skyscraping office buildings of the downtown sections of Manhattan, did not come with the early development of the port. They came only after the frontage values had become enormous, and to accommodate a specific class of trade; just as the skyscrapers came when the land areas became extremely expensive and the demand for concentration of business offices about the financial center made them a necessity.

The development of Jamaica Bay will not begin with the introduction of Chelsea piers, nor Hudson Terminal buildings. On the contrary, it will start in all probability with accommodations in keeping with an eighteen foot channel at mean low water. It will be a distributing point for all kinds of materials needed in the building up of the adjacent interior territory; it will furnish the sites for industrial enterprises, including those for the manufacture of commodities where the raw material and finished products may have an opportunity for transportation by water and rail alike; it will supply, in addition to wharfage, spaces where for the time being, at any rate, large areas will be required.

As time goes on the development will be on a higher commercial plane, and it may be that some day some of the first enterprises will have to give way to strictly commercial projects. However this may be, however uncertain the details of the future progress may be, or how impossible it may be to predict with any degree of certainty the wharfage required by 1950, we may rest assured that it will be a wise thing to allow plenty of room now, and to plan with a wide enough margin to permit, if possible, the installation of the things most desirable in the practice of that time.

BARGE CANAL TERMINAL.

The State of New York has undertaken the deepening of the Erie Canal so that barges of large size may navigate between the Great Lakes and the seaboard. The advantage to be derived will be the reduction in cost of transportation due to the economies of administration. It is probable that barges of six times the carrying capacity of the present ones will be brought into use. As the labor and subsistence charges for these barges will not be materially increased, the total fixed charges, including fuel, repairs, insurance upon vessels and upon cargoes, interest on investment, sinking fund and miscellaneous items, will be about doubled, while the carrying capac-

ity through increased tonnage and greater number of round trips may be multiplied by eight.

The estimated cost of the enlarged canal is one hundred and one million (\$101,000,000) dollars.

Its low freight rates will undoubtedly bring to New York many millions of tons of commodities for home consumption and domestic and foreign export that would be excluded from the market entirely, or would find an outlet through another channel.

In his last report the writer referred to the increase in commerce of New York which would be due to the low rates that would maintain on the new barge canal, and also due to the reduction in rail rates to meet them. There seems to be a tendency to bring about a reorganization of the methods of distribution of different classes of freight between the rail and water carriers.

Even should the enlarged barge canal prove a failure (and the writer does not believe it will) as to the quantity of freight carried, it will lower in any event the cost of transportation to and from New York, and will induce a vast amount of additional commerce through our port; bringing into existence also commodities the manufacture of which has heretofore been unremunerative on account of the excessive cost of shipment to market.

It is a reasonable assumption in the case of New York that railroad rates from the Northwest will be lowered, that railroads will do a larger business, and that the barge canal will bring millions of tons to New York City annually, for local consumption and for trans-shipment.

It is hardly probable that it will be desirable to have but one union terminal as a distributing center for this entire barge traffic, as this would necessitate in many cases a double handling when one should suffice, particularly so in the cases of commodities for local consumption destined for widely separated sections of the city. It seems probable that there will be more than one terminal.

There is a class of freight that may be treated separately and handled in a separate section; this is shipments in mass of commodities between the Great Lakes and foreign or domestic Atlantic ports. In the opinion of the writer parts of the interior of Jamaica Bay where the islands now exist are well adapted for such a center. It would relieve the Manhattan and Brooklyn shore fronts above the Narrows of the additional burden of supplying wharfage for tonnage which is merely in transit to other ports, and it would leave for the commerce requiring it the portions of Jamaica Bay better situated for highly developed railroad connections.

Such location would permit the barge traffic to come down parallel to the axis of the Hudson River and Upper Bay, and the additional distance (about 15 miles), would be but a small percentage of the total distance between the lakes and the ocean.

The passage from the Upper Bay to Jamaica Bay could be effected by the present Coney Island Channel, and need in no way interfere with those to the southward.

While the passage to the entrance to Jamaica Bay will be at times rough, it should be borne in mind that the refuse from the garbage cans of New York is brought to Barren Island in Jamaica Bay on relatively small deck scows (with deck loads averaging 350 tons), and during the past fourteen years the disposal company has not lost as many days on account of storms. They use the westerly passage at Rockaway Inlet, and while the entrance to the proposed new passage will be somewhat more exposed, a large number of the canal barges of the future for reasons of economy will exceed 1,000

tons capacity. In any event, and especially should the smaller sized barges be retained to any extent, the building of a breakwater from Norton Point, Coney Island, to the northwestward across the mouth of Gravesend Bay would not only give them ample protection during heavy storms, but would furnish a much-needed harbor of refuge or port of call at the southern entrance to New York, and furnish anchorage ground for vessels generally, as well as bring into greater usefulness the shores of Gravesend Bay, parts of which would then be available as a relief for the Upper Bay and for certain classes of barge canal traffic not desired in Jamaica Bay.

Since his appointment to the Jamaica Bay Improvement Commission the writer has made two trips to Europe, during which he has visited and inspected most of the important harbors on that side, some twenty-five or more. Among the notable things of professional interest was the wonderful development of the barge traffic throughout the lowland countries of northwestern Europe. Most of the ports in this section are at considerable distance from the sea and large parts of the cargoes are transferred directly into barges of 1,000 tons and upward to be conveyed still farther up the rivers and well into the interior.

R. M. Hurd states most concisely a well demonstrated law:

"Trade routes, the lines of least resistance between the source of products and their final markets, have in all ages located cities at the points where the break in transportation occurs."

Should the interior islands of Jamaica Bay become the situs of the break in transportation of the water trade route connecting our great lake regions and Europe, a gradual but extensive development of the section will be sure to follow, and the city will not only profit by the increment in land values, but will be able to provide accommodations for shipping at rates low enough to make the port attractive to commerce generally.

SUMMARY.

The following is a short outline of some of the conditions before us:

1. In a comparatively few years the natural increase in commerce will have brought into demand all the available water front of the present Port of New York.

2. Before this occurs the small supply for largely increased demand will send the prices of wharfage up beyond a reasonable rate.

3. This will drive some commerce away to ports which will answer the purpose, but where the charges are less.

4. In the meantime some new commerce will still come and pay the advanced rates, until finally all the room is not only used up, but some of it doing double duty.

5. After that new commerce must go elsewhere.

6. Competing ports will take advantage of the situation and under the stimulus of great relative advance in commercial prosperity will be spurred on to making their localities so attractive that they will draw still further from New York commerce.

7. New York, having come to a standstill while the rest of the country is advancing, will lose prestige and in the course of time suffer very seriously in many ways.

8. If, however, through the forethought of the Federal and City Governments, a place can be secured which will answer as a place for overflow commerce, the situation will be greatly relieved. If at the same time such a place should be capable of large ultimate development upon broad and progressive plans, the solution of the problem will be well in sight, and New York need have no fear of losing her supremacy for many years to come.

9. Jamaica Bay is capable of adding to the harbor of New York over one hundred and fifty (150) miles of wharfage for vessels, as well as providing large areas for manufacturing, warehousing, storage, railroad trackage, etc.

10. It will be several hours nearer Europe than the present port.

11. It can have less dangerous channels.

12. It can be made to a large degree the terminus of the new 1,000 ton Barge Canal when completed.

13. It can become a center for certain kinds of trade and manufacture without disturbing the interests of the existing built-up sections of the Greater New York.

14. It is already within 40 minutes of downtown Manhattan, under ordinary every day schedules.

15. The cost of construction will be less than usual about New York.

16. Its development will reclaim thousands of acres of low land, making them productive where they are now of little value.

17. The existence of a harbor in this vicinity will reduce the cost of many commodities within its immediate neighborhood.

18. It will, through the decreased freight rates and hence reduced ultimate cost of building materials, result in a more rapid development of the adjoining interior.

19. It should reduce the cost of living.

20. It should also give active employment to many people.

21. It can, by proper arrangement of railroad systems, in advance, be placed in direct touch with the interior of the United States, and there would be ample room for terminals.

22. The through-freight rates between the interior states and Jamaica Bay can most probably be as low as to any other part of New York City.

23. In some cases the shipments between it and the West can be even cheaper than where several haulings of goods are required, as now in particular sections of New York City.

24. The development of Jamaica Bay section will provide a place for homes of very many thousands of people within a short radius from the central parts of New York City.

25. The development of the bay can be made for many millions of dollars less for the advantages to be gained than would be required in any other available section of equal size.

26. Unless New York takes up this development of Jamaica Bay actively, New Jersey will forestall her in the development of the Newark Meadows, where several of the great railroads already have their termini.

27. The City of Newark proposes a vast development of the meadows adjacent to her.

28. She has already prepared a plan for a start, and has appropriated \$1,000,000 to get it under way.

29. Commerce once gained, if accompanied with inducements equal to those of other ports, generally stays through force of habit.

30. Commerce once lost is difficult to regain.

31. If New Jersey goes ahead of us, she will get for her citizens the wealth and prosperity attendant upon increased commerce—which the citizens of New York might have had.

RECOMMENDATIONS.

The writer would recommend an expenditure within the next ten years of approximately \$12,000,000 for the development and control of the waterfront in Jamaica Bay, and that the appropriations be progressive.

That at least \$1,000,000 be appropriated and set aside at once, to comply with the provision of Chapter 568 of the Laws of 1909.

That a total of \$3,000,000 be appropriated within the near future in ample time

for the secretary of war, if he so desires, to report that the City of New York is ready to perform her part of the initiatory work called for in his report of February 26, 1909; as well as to give the committees of Congress an opportunity to incorporate an adequate appropriation in the river and harbor bill this session.

That the city acquire as speedily as practicable all of the desirable meadow upland needed to receive the material from the bay to be dredged to a depth of 18 feet between the proposed city bulkhead line and the outer edge of the proposed 500-foot channel, and from the proposed basins, as can be secured at a fair price, that is, the entire 18-foot project.

It is recommended that the 18-foot channel be begun as soon as appropriations are available from the Federal government and the City of New York, and be continued progressively until completion.

That after the city shall have acquired the necessary upland, one or more of the proposed basins with its immediate vicinity be connected with the main channel, and developed through dredging, bulkheading, grading, constructing streets, etc., so as to be able to receive and handle freight to the best advantage.

That thereafter the zone between the main channel and the city bulkhead be dredged to a depth of 18 feet.

The dredgings from the channels should be placed behind either temporary rip-rap retaining walls, or inexpensive concrete and masonry bulkheads; the former where the probable use of the upland would be more remote, and the latter within the zones of more immediate utility.

Assuming 2,500 acres of land as necessary to receive the dredgings to a depth of 18 feet between bulkhead line and outer edge of 500-foot channel, as well as from the basins, at the high figure of \$1,000 per acre, and 10 cents per cubic yard, the cost assumed by the majority members of the commission; the cost of land, dredging and bulkheading along the main channel would be as follows:

2,500 acres of land at \$1,000 per acre.	\$2,500,000
Dredging 500 foot channel	
18 feet deep, 15,500,000 yards, at 10 cents.....	\$1,550,000
Less rebate	1,240,000
	310,000
Bulkheading 43,000 linear feet at \$60..	2,580,000
Contingencies and administration....	429,000

(1) Cost of land for entire 18-foot project, bulkheading entire front and dredging entire 500-foot preliminary channel \$5,819,000

Suggested allotment to go to dredging and high development of one basin, or parts of two or more basins 2,800,000

(2) Cost of land for entire 18-foot project, dredging entire 500-foot preliminary channel, and partial high development of one or more basins \$8,619,000

Dredging to 18 feet between 500-foot channel and bulkhead line, 27,800,000 yards, at 10 cents \$2,780,000

Contingencies and administration 139,000

2,919,000

(3) Cost of land for entire 18-foot project, dredging between bulkhead and outer edge of 500-foot channel, and partial high development of one or more basins \$11,538,000

Approximate allowance for buildings and unforeseen contingencies 462,000

Total cost \$12,000,000

(4) Proposition No. 2, by using a rip-rap sea wall, costing about \$7.50 per running foot, could be executed for, in round numbers \$6,000,000

Respectfully, WILLIAM G. FORD,
Consulting Engineer, Commissioner.
New York City, December 27, 1909.



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in addition to the above, the Eagle has a wide range of features. Here is a schedule of some of them:

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Two pages of sermons. Home dressmaking department. "Arabella and I" stories. Notes of the Children's Department Clubs.

TUESDAY

Review of all the new attractions in Brooklyn playhouses—Table and Kitchen Notes—Suggestions for Club Workers.

WEDNESDAY

Kate Upson Clark's Talk to Women—Junior Eagle puzzle solvers' names—New puzzle club members.

EVERY DAY

the Eagle contains special features of interest to men, women and children. For instance, here are some departments you will find EVERY DAY:

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WOMEN'S DEPT.

QUESTIONS ANSWERED

SCHOOLS AND COLLEGES

WALKS AND TALKS

CHILDREN'S DEPT.

FICTION

THURSDAY

Reports of work done by Fresh Air Club workers—Hints for amateur milliners, with special illustration.

FRIDAY

The Jewish Review—An article on Beauty and Hygiene—Humane Club news, letters from members, new members, etc.

SATURDAY

News of Churches, both Catholic and Protestant—The Industrial Age—The weekly real estate page—Reviews of the new books—A special page of Long Island news—Paper doll for children—A special story for children—News of women's clubs—Missionary societies and W. C. T. U.—Table and kitchen notes.

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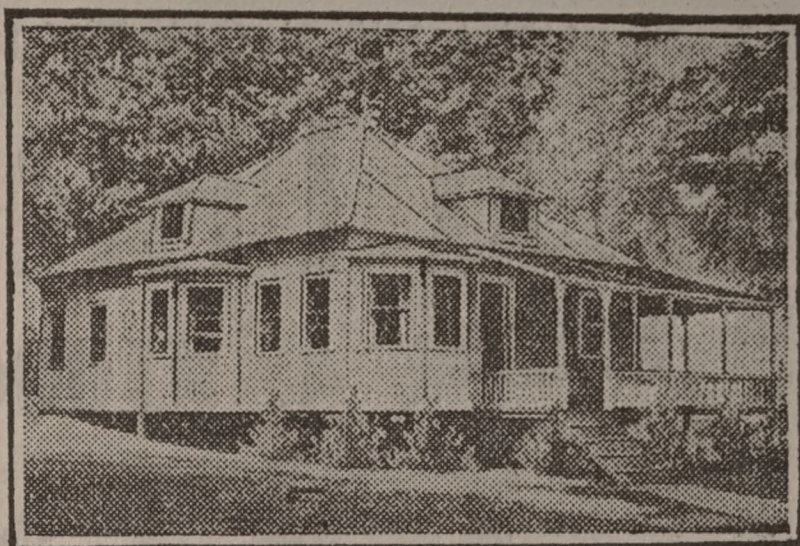
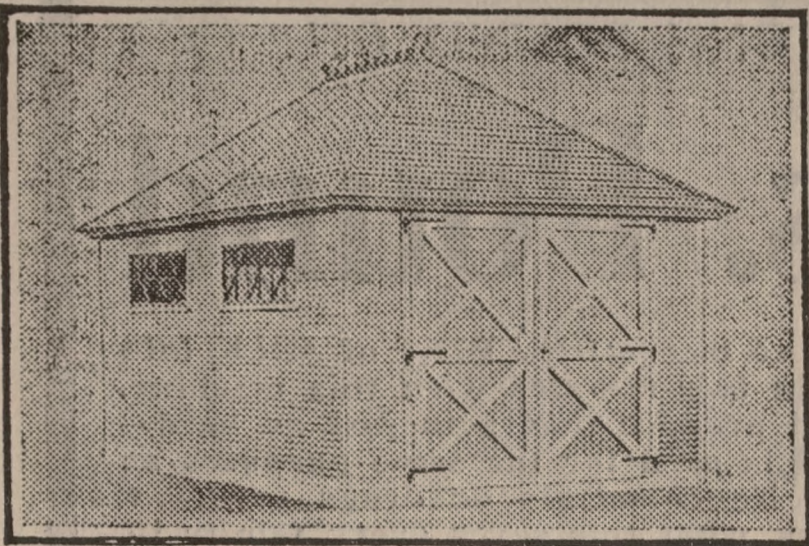
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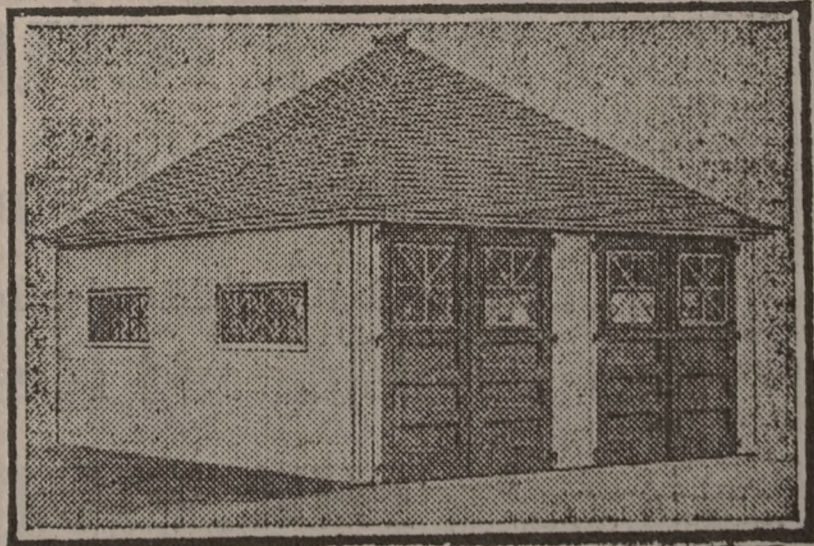
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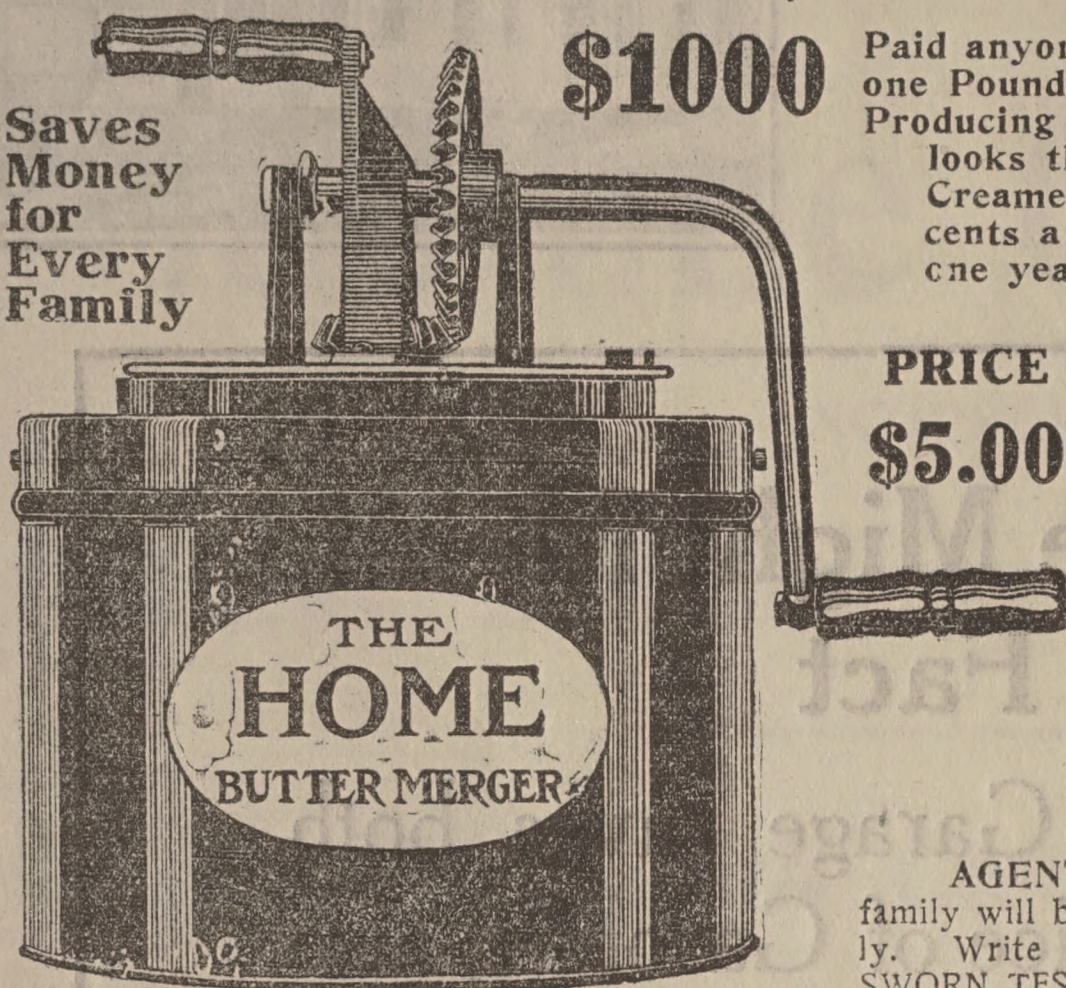
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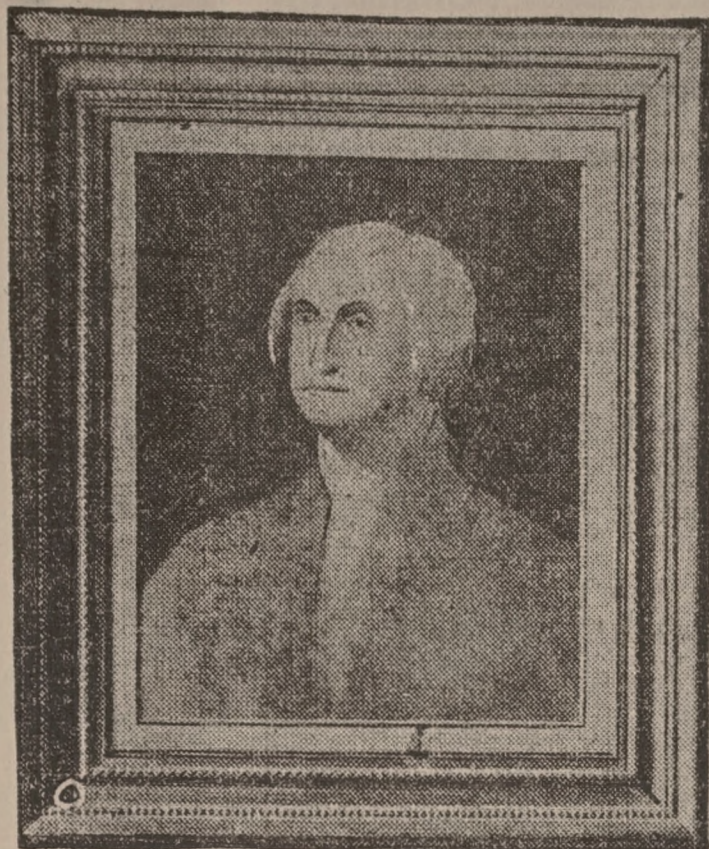
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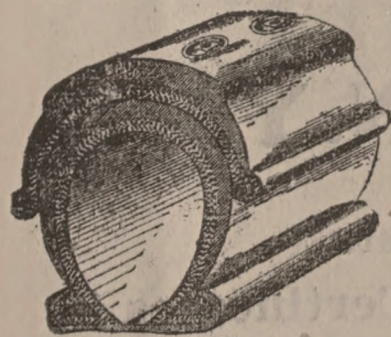
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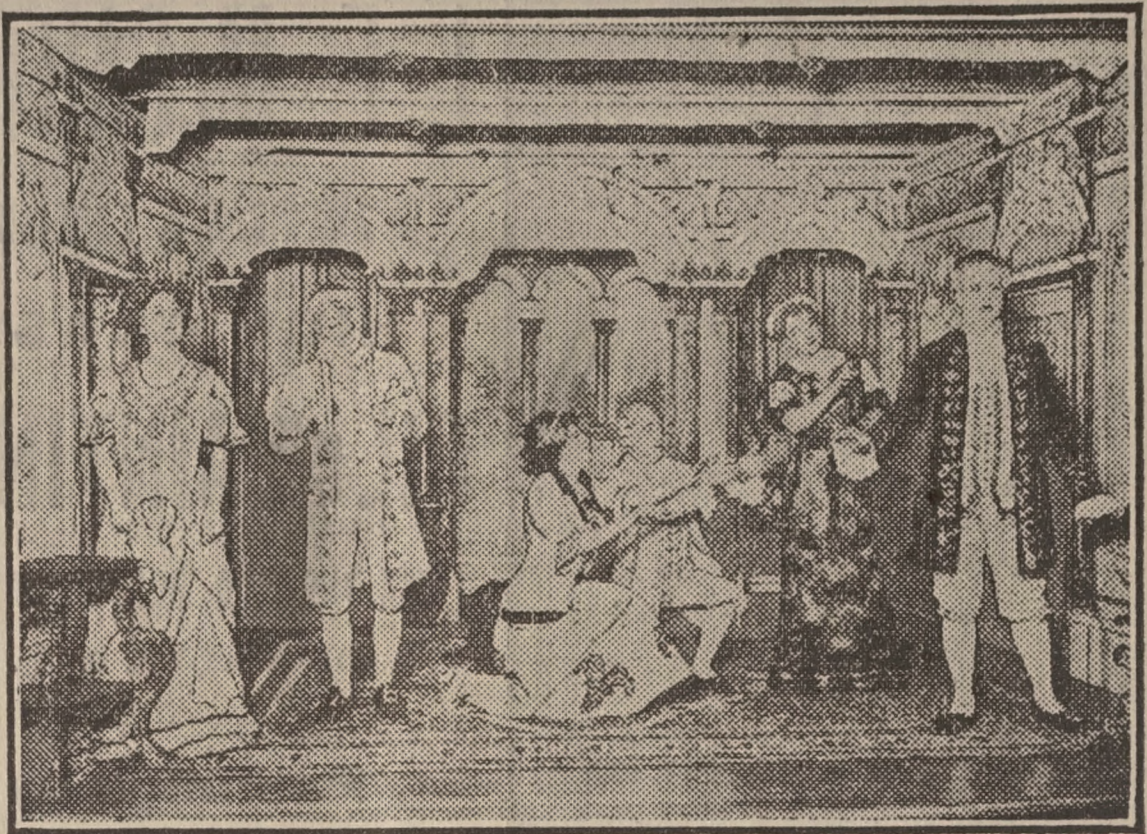
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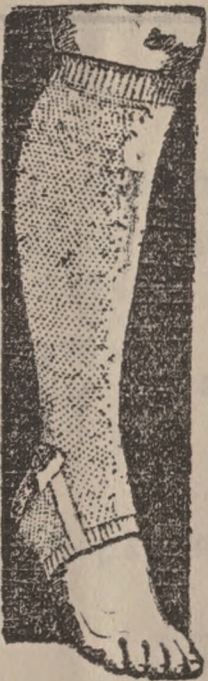
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